ASSOCIATION OF CANADIAN UNIVERSITIES FOR NORTHERN STUDIES
ASSOCIATION UNIVERSITAIRE CANADIENNE D'ÉTUDES NORDIQUES

EIGHTH ANNUAL CONFERENCE
BOREAL INSTITUTE FOR NORTHERN STUDIES,
UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA

APRIL 25-27, 1985

NORTHERN ENGINEERING: ORGANIZATION AND POLICY WITH REPORT OF THE 1985 CONFERENCE

HUITIÈME CONFÉRENCE ANNUELLE
l'INSTITUT BORÉAL D'ÉTUDES NORDIQUES,
l'UNIVERSITÉ DE l'ALBERTA
EDMONTON, ALBERTA

DU 25 AU 27 AVRIL 1985

l'INGÉNIERIE NORDIQUE: ORGANISATION ET POLITIQUES AVEC LE RAPPORT DE LA CONFÉRENCE DE 1985

DECEMBER/DÉCEMBRE 1985

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ASSOCIATION OF CANADIAN UNIVERSITIES FOR NORTHERN STUDIES

The Association represents thirty-four Canadian universities active in northern studies, research and training. Founded at Churchill, Manitoba in 1977, it is a federally incorporated charitable organization.

The purpose of the Association is the advancement of northern scholarship through education, professional and scientific training, and research.

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PREFACE

The annual meetings of the Association of Canadian Universities for Northern Studies (ACUNS) are held every spring at a different location. They have two broad purposes - to allow the ACUNS Council to conduct its required annual business meeting and to address an important Northern Studies theme. As the meetings are usually held on the campus of a member university, they also provide an opportunity for the host institution to brief the Association on its northern activities.

This volume is a report on all three of these activities from meetings held at the Boreal Institute, University of Alberta. As is apparent from the title of this volume, the meeting's theme "Northern Engineering: Organization and Policy" is emphasized. We are grateful to all contributors for their willing cooperation at all stages.

W. Peter Adams,
Executive Director

November 29, 1985

PRÉFACE

L'Assemblée annuelle de l'Association universitaire canadienne d'études nordiques (AUCEN) se déroule chaque année dans un lieu différent. Cette rencontre vise deux grands objectifs, soit de permettre au Conseil de l'AUCEN de tenir sa réunion d'affaires annuelle statutaire, et de débattre un thème nordique important. Comme les réunions se déroulent habituellement dans le campus d'une université membre, elles permettent à cet établissement de haut savoir de mieux faire connaître ses activités nordiques aux autres membres de l'Association.

Le texte qui suit constitue un rapport sur ces trois aspects des réunions qui se sont tenues à l'Institut boréal de l'Université de l'Alberta. Comme le titre du volume l'indique clairement, c'est l'"Ingénierie nordique: organisation et politiques" qui en a constitué le thème particulier. Nous remercions vivement toutes les personnes qui ont aimablement contribué à tous les aspects de cette rencontre.

Le Directeur général
W. Peter Adams
le 29 novembre 1985

INTRODUCTION DU PRÉSIDENT

Voici le Compte rendu des débats de la Huitième assemblée générale de l'Association universitaire canadienne d'études nordiques; elle s'est déroulée du 25 au 27 avril 1985 à Edmonton, sous les auspices de l'Institut boréal de l'Université de l'Alberta. C'est de cette réunion que date, en fait, ma nomination à la présidence de l'AUCEN; on procède généralement ainsi, mais l'Assemblée a surtout constitué une célébration de l'année achevée, dernière année de la présidence du Professeur Gordon Nelson, de l'Université de Waterloo.

Le Professeur Nelson, mon prédécesseur, a été président de l'AUCEN de 1981 à 1985, et le Conseil bénéficie toujours de sa collaboration. Au cours de sa présidence, il a successivement oeuvré avec deux directeurs généraux, puis en a engagé un troisième; et pendant une longue période, il a assumé les fonctions de directeur général en même temps que la présidence.

Je me fais l'interprète de l'Association et du Conseil pour mettre publiquement en évidence la contribution du Professeur Nelson aux activités de l'AUCEN et aux progrès du Nord canadien. Ses apports ont été nombreux et divers, tant en sa qualité de président que comme expert. Je vais citer deux domaines d'activité qui, du point de vue de l'Association, mettent parfaitement en relief le dynamisme du Professeur Nelson et son esprit d'initiative: la mise sur pied de la Fiduciaire canadienne d'études nordiques et le Colloque sur le patrimoine de l'Arctique, qui s'est réuni en août dernier à Banff, sous les auspices de l'AUCEN. C'est au cours de sa présidence que M. Gordon Nelson a piloté la mise sur pied et le développement de la Fiduciaire, laquelle a permis de répartir plus de 100 000 dollars de subventions à des chercheurs chevronnés et à des étudiants du Nord canadien et du Sud de notre pays. La Fiduciaire est devenue l'un des pôles d'activités de l'AUCEN, contribuant ainsi tant aux efforts des universités que nous représentons qu'au developpement du Nord auquel nous nous consacrons. Le Colloque sur le patrimoine de l'Arctique a permis de réunir les délégués de douze nations boréales pour débattre en profondeur la "préservation" du Nord dans son sens le plus large possible. Nous envisageons avec plaisir de contribuer à la publication du Compte rendu de ce Colloque.

Je remercie donc publiquement le Professeur Gordon Nelson, de la part de l'Association et du Conseil, pour son apport durable et considérable à

l'oeuvre de l'AUCEN. Celle-ci envisage avec plaisir une longue collaboration avec M. Nelson.

Les entretiens de l'Institut boréal, que le Compte rendu illustre en détail, furent couronnés de succès, largement grâce à l'hospitalité et à l'efficacité des services de l'Université de l'Alberta, qui accueillait l'Assemblée. L'Institut boréal constitue lui-même un foyer dynamique d'études nordiques au Canada. Ses services de bibliothèque et d'information sont des modèles pour nous tous, et il a fait une large contribution à l'enseignement et à la recherche au Yukon. L'AUCEN remercie chaudement l'administration et le corps professoral de l'Université pour leur hospitalité.

Les réunions ont porté sur le thème de l'ingénierie nordique, de son organisation et de sa politique à suivre. L'AUCEN est une association qui met en relief les activités diverses des 34 universités constituantes, dont chacune se consacre très activement à la recherche nordique; l'Association s'efforce de choisir pour ses assemblées générales des thèmes autour desquels il est possible d'organiser des contributions variées aux études nordiques. C'est ce qu'a fait très exactement le thème choisi pour l'Assemblée de 1985. À Edmonton, des ingénieurs et d'autres spécialistes se sont intéressés, non seulement aux problèmes propres à l'ingénierie, mais aussi à leurs aspects sociaux et décisionnels. Nous sommes très reconnaissants envers les experts dont les communications figurent dans le présent Compte rendu, et dont les exposés oraux ont stimulé les débats. Je remercie en particulier le Professeur Garry K.C. Clarke, de l'Université de la Colombie-Britannique, qui a piloté le déroulement de la journée d'études.

L'Assemblée générale de 1986 sera convoquée à Yellowknife, afin d'y rassembler les délégués des universités à vocation nordique et ceux des Territoires, dans le cadre d'une journée d'information réciproque. C'est un comité mixte Territoires-AUCEN qui s'occupe de préciser les détails de l'ordre du jour. J'espère de tout coeur que cette rencontre aidera les Nord-Canadiens à utiliser du mieux possible les énormes ressources humaines et autres des universités canadiennes. J'espère également que les représentants de nos universités membres tireront un excellent parti de cette rencontre, et pourront ainsi se familiariser avec les potentialités, les besoins et les aspirations du Nord, et particulièrement des Territoires.

La rencontre de Yellowknife va taxer lourdement les ressources de l'AUCEN. C'est pourquoi je presse toutes les universités membres de consacrer

toutes leurs disponibilités à cette entreprise.

Au cours des deux années à venir, nous préparons ainsi une rencontre des quatre universités "à vocation subarctique" (Université du Québec en Abitibi-Témiscamingue, Université du Québec à Chicoutimi, Lakehead University et Université Laurentienne) et une grande Conférence nationale des étudiants. J'espère qu'il me sera très bientôt possible de donner tous les détails concernant ces deux activités, ainsi que d'autres.

Je m'efforcerai, en tant que nouveau président de l'Association, de bâtir sur les solides fondations jetées par mes prédécesseurs, tout à l'avantage du Nord canadien et des universités concernées.

Marc-Adélard Tremblay
le 29 novembre 1985

PRESIDENT'S INTRODUCTION

This volume is a record of the eighth annual general meeting of the Association of Canadian Universities for Northern Studies. The meetings were hosted, in Edmonton, by the Boreal Institute of the University of Alberta on April 25-27, 1985. Although my appointment as President technically dates from the meetings, as is usual in such cases, the annual general meeting itself was essentially a celebration of the preceding year, in this case the last year of the Presidency of my predecessor, Professor Gordon Nelson of the University of Waterloo.

Professor Nelson, still, happily, a member of our Board, was President of ACUNS from 1981 to 1985. During this time, he worked with two Executive Directors and hired a third. For a considerable period, he was effectively Executive Director as well as President.

I would like to take this opportunity, on behalf of the Association and Board, to formally recognize Professor Nelson's contributions to ACUNS and the North. His contributions, as President and as a scholar, have been numerous and varied. From the point of view of the Association, I would mention two areas of activity which epitomize Gordon Nelson's energy and creativity. These are our Canadian Northern Studies Trust and the Arctic Heritage Symposium which we hosted in Banff last August. As President, Dr. Nelson oversaw the creation and development of our Trust which last year awarded well over $100,000 to southern and northern students and senior researchers. The Trust has become one of the pillars of ACUNS' activities, contributing both to the universities, which we represent, and to the North which we serve. The Arctic Heritage Symposium involved twelve northern nations in a focussed consideration of "conservation" (in the broadest possible sense of that term) in the North. We look forward to assisting in the publication of the Symposium Proceedings.

On behalf of the ACUNS Board and Council, I publicly thank Gordon Nelson for his enormous and lasting contribution to our work. I look forward to a long future association with him.

The Boreal Institute meetings, which are documented here, were a great success. This was due in no small measure, to the courtesy and efficiency of our hosts, the University of Alberta. The Boreal Institute itself is a thriving focus of northern studies in Canada. Its library and information

systems, for example, are models for us all. It has made particular contributions to research and teaching in the Yukon. ACUNS is indebted to the faculty and administration of the University of Alberta for their hospitality.

The theme of these meeting, the title of this volume, was Northern Engineering: Organization and Policy. ACUNS, as an organization which represents the diverse activities of thirty-four universities, each of which has a very serious commitment to northern work, tries to select topics for its annual meetings which have the effect of focussing the diverse interests in Northern Studies. The 1985 theme did this very effectively. In Edmonton, we had engineers and others, addressing not only engineering problems but also social and policy ramifications of those problems. We are most grateful to all contributors to this volume for their written contributions and for their oral presentations which stimulated active discussion. I am particularly grateful to Professor Garry K.C. Clarke of the University of British Columbia for chairing the theme session.

In 1986, we will hold our annual meetings in Yellowknife with a view to bringing the universities and the Territories together in a sort of mutual briefing session. Details of the program are being worked out by a joint Territories - ACUNS committee. I sincerely hope that these meetings will help the people of the North to take full advantage of the enormous human and other resources of Canada's universities. I also hope that the representatives of our universities will take full advantage of the occasion to become better acquainted with the potentials, needs and aspirations of the North, especially the Territories.

The Yellowknife meetings will severely strain the resources of ACUNS. I urge all our member institutions to cooperate to the fullest limit of their ability.

During the next couple of years, we also plan a meeting of four "subarctic universities" (Université du Québec en Abitibi-Témiscamingue, Université du Québec à Chicoutimi, Lakehead University and Laurentian University) and a major National Student Conference on Northern Studies. I expect to be able to provide full details of these and other ventures in the near future.

As a new President, I hope to build on the strong foundations of my predecessors to the benefits of Canada's North and of the universities.

Marc-Adélard Tremblay

29 November 1985

ASSOCIATION OF CANADIAN UNIVERSITIES FOR NORTHERN STUDIES
ASSOCIATION UNIVERSITAIRE CANADIENNE D'ÉTUDES NORDIQUES

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Urion, C.	Director, Native Student Affairs, University of Alberta
Wilson, Warren	Reid, Crowther & Partners Limited, Saskatoon

PROGRAMME

HOST: UNIVERSITY OF ALBERTA

ANNUAL CONFERENCE
EDMONTON, ALBERTA
APRIL 25 - 27, 1985

Thursday, April 25, 2000

Registration - Hotel Convention Inn, Suite 331
Informal discussion with the President & Board of Directors

Meetings will take place in Room 401-403, Mechanical Engineering Building, University of Alberta

Simultaneous interpretation will be provided during the Conference

Friday, April 26

0830	Bus departs Hotel Convention Inn
0900 - 1530	**NORTHERN ENGINEERING: ORGANIZATION AND POLICY**
0900	Welcome
0930	Dr. Lorne W. Gold, Division of Building Research, NRC "Institutional Advantages and Disadvantages in Meeting Northern Engineering Challenges"
1000	Dr. Peter F. Adams, President, Centre for Frontier Engineering Research, University of Alberta "C-FER Programs and the Northern Engineering Challenge"
1030	Coffee
1100	Dr. A.E. Pallister, President, Pallister Resource Management Ltd. "The Interface between Engineers in Industry and the Educational System and Facilities"
1130	Dr. R.R. Riewe, Department of Zoology, University of Manitoba "Adapting to Northern Technology —An Historical Perspective"
1200	Lunch — A Buffet lunch will be served.
1345	Dr. J.C. Stabler, Department of Economics, University of Saskatchewan "Use of Economic Simulation Models in Socio-Economic Analysis of Engineering Projects in the North"
1415	Dr. R.W. Scace and Dr. W. Wilson, Reid, Crowther & Partners Ltd., Calgary "The Consultants' Views on Organization and Policy in Northern Engineering Research"
1445	Speaker to be named "Indigenous Participation in Northern Engineering"
1515	Discussion
1530 - 1700	**CANADA — U.S.S.R. ARCTIC SCIENCE EXCHANGE PROGRAM** A presentation by Walter Slipchenko, Co-ordinator, Circumpolar Affairs Division, Department of Indian and Northern Affairs, followed by a discussion period.
1700	Bus returns to Hotel Convention Inn
1830	Bus departs Hotel Convention Inn
1900	Reception — Boreal Institute for Northern Studies
2000	Dinner — University of Alberta Faculty Club
2200	Bus returns to Hotel Convention Inn

Saturday, April 27

0830	Bus departs Hotel Convention Inn
0915 - 1215	**UNIVERSITY OF ALBERTA PRESENTATION**
0915	Boreal Institute for Northern Studies A summary of its activities *C. Hickey*
0945	Cene Mapping Project *M. Asch*
1015	Coffee
1045	Biological Sciences — The Practical Application of Several Biological Projects *W. Mackay*
1115	School of Native Studies *C. Urion*
1145	International Linkages *M. Freeman*
1215 - 1330	Lunch — Buffet lunch Informal discussion of the Northern Scientific Training Program, Department of Indian & Northern Affairs
1330 - 1630	ACUNS Annual General Meeting
1630	Bus returns to Hotel Convention Inn

DISPLAYS will be provided by Université de Montréal, Ryerson Polytechnical Institute and Ely Panipakoocho, Arctic Research Establishment, Pond Inlet, N.W.T.

CONFÉRENCE ANNUELLE
EDMONTON, ALBERTA
DU 25 AU 27 AVRIL 1985

Jeudi 25 avril, à 20h

Inscription à l'Hotel Convention Inn, Salle 331
Rencontre informelle avec le Président et les membres du conseil d'administration

Les réunions se dérouleront aux salles 401-403, Mechanical Engineering Building, l'Université de l'Alberta

Un service d'interpretation simultanée sera assuré

Vendredi 26 avril

8h30	Départ de l'autobus de l'Hôtel Convention Inn
9h à 15h30	**"L'INGÉNIERIE NORDIQUE: ORGANISATION ET POLITIQUE À SUIVRE**
9h	Allocution de bienvenue
9h30	M. Lorne W. Gold, de la Division des recherches en bâtiment, CNRC "Avantages et inconvénients structurels de la réponse aux défis de l'ingénierie nordique"
10h	M. Peter F. Adams, Président, Centre for Frontier Engineering Research, l'Université de l'Alberta "Les programmes du C-FER et les défis de l'ingénierie nordique"
10h30	Pause-café
11h	M. A.E. Pallister, Président, Pallister Resource Management Ltd. "Les ingénieurs de l'industrie face au système d'éducation"
11h30	M. R.R. Riewe, du Département de zoologie de l'Université du Manitoba "Rétrospective sur l'adaptation à la technologie nordique"
12h	Buffet froid
13h45	M. J.C. Stabler, du Département des sciences economiques de l'Université de la Saskatchewan "Utilisation des modèles économétriques pour l'analyse socio-economique des projets d'ingénierie nordique"
14h15	MM. R.W. Scace et W. Wilson, de Reid, Crowther & Partners Ltd., Calgary "Opinion des experts-conseils au sujet de l'organisation et de la politique de la recherche d'ingenierie nordique appliquée"
14h45	Intervenant non précisé "Participation des Autochtones a l'ingénierie nordique"
15h15	Débat
de 15h30 à 17h	**PROGRAMME D'ÉCHANGES CANADO-SOVIÉTIQUE EN SCIENCES ARCTIQUES** Cet exposé de M. Walter Slipchenko, Coordonnateur à la Division des affaires circumpolaires, Ministère des Affaires indiennes et du Nord, sera suivi par un débat.
17h	Retour de l'autobus à l'Hôtel Convention Inn
18h30	Départ de l'autobus de l'Hôtel Convention Inn
19h	Réception à l'Institut Boréal d'études nordiques
20h	Banquet au Faculty Club, l'Université de l'Alberta
22h	Retour de l'autobus à l'Hôtel Convention Inn

Samedi, 27 avril

8h30	Départ de l'autobus de l'Hôtel Convention Inn
9h15 à 12h15	**EXPOSÉ DE L'UNIVERSITÉ DE L'ALBERTA**
9h15	L'Institut Boréal d'études nordiques Un sommaire de ses activités *C. Hickey*
9h45	Le projet de cartographie Déné *M. Asch*
10h15	Pause-café
10h45	Les sciences biologiques L'utilisation pratique de quelques projets biologiques *W. Mackay*
10h15	L'école d'études autochtones *C. Union*
11h45	Les liaisons internationales *M. Freeman*
12h15 à 13h30	Buffet froid Débat informel sur le Programme de formation scientifique dans le Nord du Ministère des Affaires indiennes et du Nord
13h30 à 16h30	Assemblée générale annuelle de l'AUCEN

LES REPRÉSENTATIONS GRAPHIQUES seront fournies par l'Université de Montréal, l'Institut polytechnique Ryerson, et Ely Panipakoocho, Arctic Research Establishment, Pond Inlet.

NORTHERN ENGINEERING: ORGANIZATION AND POLICY

NORTHERN ENGINEERING: ORGANIZATION AND POLICY

In the past, at its Annual General Meeting, ACUNS has held special sessions on such topics as Northern Health and the Social Sciences in the North. A principal intent is to bring experts together to address a concern succinctly, identify issues and generate recommendations. Another purpose is to provide a learning focus for the ACUNS councillors and others invited to the AGM. The special session presents an opportunity for northern scientists, scholars, administrators, and others to gain more understanding of a particular topic or field and to use that knowledge in their work. The publication of the results of the special sessions means the findings are distributed to a wider audience.

"Northern Engineering: Organization and Policy" was a session intended to point up some of the advances, some of the opportunities, and some of the obstacles facing engineers in the North. A reading of the following papers by Gold, Adams, Pallister, Scace and Wilson, Stabler, and Riewe highlights these. Lorne Gold underlines the need for developing institutions to meet engineering knowledge needs in the North on a continuing basis. Peter F. Adams describes the workings of one such institution, The Centre for Frontier Engineering Research (C-FER) and notes the range of topics it is already working on. A.E. Pallister addresses the interface between engineers in industry and the educational system and calls for mechanisms to promote wider collaboration. Scace and Wilson note the ongoing achievements and difficulties of the consultant, dealing in particular with knowledge gains and needs at the medium to small scale rather than the megaproject level. They focus on local and community needs and the service of engineers and related designers.

Stabler and Riewe deal with matters ancillary to or arising from northern engineering projects. Stabler's concern is the economic impact -- perhaps better to say the socio-economic impacts -- of large scale developments, notably in the Beaufort Sea-Mackenzie Delta region, where the <u>indirect</u> costs of development on housing, schools, medical care, etc. are not seen as having been well addressed in the EIA procedures. Riewe focusses on the social aspects of technology or engineering and in particular on the richness of

indigenous Inuit technology, its utility and our lack of appreciation of it and its implications.

Among the recommendations made in the papers which should be carefully considered by the engineering fraternity - the APOA, the CPA, the NAPEGG, as well as ACUNS, the federal government, and other agencies are:

1. An institutional system is needed to support northern engineering which will:
   - be responsive to the needs of engineering practice;
   - be open and easily accessible so that the knowledge it acquires is freely available to all;
   - be able to take advantage of opportunities for observing performance and to benefit from the process of feedback;
   - have the means to prove the value of new knowledge and technology and to have that which is of value incorporated into practice;
   - have a structure that will encourage and support the joint efforts of universities, government bodies and industry.
2. A Northern Technology Communication Foundation -- similar in structure to ACUNS but with a different clientele -- should be part of the system.
3. A major "Futures in the North" Engineering Technology Symposium should be held, basically as a means of building such a system, the issues to be addressed, and the manner in which to proceed.
4. A fully staffed Northern Applied Technology Development Centre should be developed in the North, ideally oriented toward demonstration and development initiatives. Areas of interest could include: transportation, communication, resource development, and waste management. In thinking about this proposal, perhaps the newly formed NWT Science Institute could deal with some of these concerns.
5. Strategic Organization with Native Development Corporations to assist them in engaging in community and regional development projects, enhancing self-reliance and breaking the overwhelming reliance on external manpower.

6. Cultivating a Northern Engineering Consultancy or working more firmly and effectively toward ensuring a sound level of northern private engineering capability which feels relatively secure in setting roots and developing traditions.
7. Requiring expanded socio-economic analysis in future impact assessments of major engineering projects such as those in the Beaufort Sea area.
8. Learning more about indigenous technology, and its role, not only directly in dealing with food, clothing, and shelter, but also in terms of its fit with a desirable sense of human goals, attitudes, lifeways, and social relations. In this sense the introduction of southern or exotic engineering should be undertaken with the advice and direction of the people using the land.
9. Promoting discussion of technological research needs, strategies and the like for Canada's North. "One recalls, for example, the Arctic Institute of North America's Arctic Research, The Current Status of Research and Some Immediate Problems in the North American Arctic and Subarctic (1955); the Government of Canada's Science and the North, A Seminar on Guidelines for Scientific Activities in Northern Canada 1972 (1973); and the more recent (1983) Applied Research in the Canadian North (F. Duerden, ex.), published by Ryerson Polytechnical Institute. A valuable exercise in determining preferred futures for science, technology and engineering in the North would be to review and evaluate this and other literature to identify the flow of ideas, to assess their worth and success and to relate them to some of the strategies suggested in this paper. Such a resource tool would well serve the community at large, and ACUNS is encouraged to sponsor such an initiative with the intent of presenting its findings at the next Annual Meeting in Yellowknife." (Scace and Wilson).

Gordon Nelson,
President, ACUNS, 1981 - 1985

NORTHERN ENGINEERING: ORGANIZATION AND POLICY
CHAIRMAN'S COMMENTARY

Canada's failure to develop an institutional focus for its northern research and engineering effort has been a longstanding puzzle. Almost as perplexing is the apparent ease with which other countries have produced successful examples for us to emulate. Norway, a small country, has not only nurtured an internationally respected research institute (Norskpolarinstitutt) but has established excellence in many areas of frontier engineering that Canada might be expected to dominate. Britain, with a minor stake in the polar regions, has developed two fine institutions (Scott Polar Research Institute and British Antarctic Survey) that have no Canadian counterparts. The paper by Dr. L.W. Gold (Division of Building Research, National Research Council of Canada) is largely concerned with the Canadian need for some such institutional focus. One of the ironies of this symposium is that, in part, it was conceived as a celebration of the national commitment to build a Cold Regions Research Institute in Edmonton. The planned institute was an unfortunate casualty of government financial restraint.

Although the Canadian effort may be unfocused, Canadians have shown a talent for creating organizations that are artfully positioned in the niche between the worlds of government, industry, academe and foundations. Examples are the Centre for Cold Ocean Resources Engineering (C-CORE) in St. John's and the Centre for Frontier Engineering Research (C-FER) in Edmonton. The paper by Dr. P.F. Adams (President of C-FER) on C-FER deserves close study because it describes an organizational structure that seems designed to maximize interactions between the participating sectors, an interaction that can only enhance the vitality and viability of C-FER.

A kind of optimism underlies the suggestion contained in the paper by Dr. A.E. Pallister (Pallister Resource Management Limited) that in Canada the missing ingredient is not some central institution but synergy. This fashionable term derives from chemistry and, roughly speaking, it is the idea that large complex systems can behave in a unified fashion that is completely unpredictable from the behavior of individual elements of the system. In Canada, Pallister seems to claim, we have most of the essential elements in place. What needs to be developed is the linkage and information flow between

these elements. If this analysis is correct, then the quest for an institutional focus is pointless. What is needed is a kind of Northern Technology Communications Foundation to disseminate information and harmonize the national effort.

Drs. R.C. Scace and A.W Wilson (Reid Crowther and Partners Ltd.) make a number of sensible points. In many cases it is consultants, like themselves, who bring together southern engineering expertise and northern engineering needs and it is the northern-based consultant, not the southern-based engineer who may have the more practical grasp of northern realities. Scace and Wilson emphasize that northern not southern needs should guide the development of future institutions. Thus while high technology may be appropriate to specific development areas such as oil and gas production, glamorous technologies should not obscure the urgent but more prosaic engineering requirements of northern communities, for example water supply and waste disposal facilities. Southern-based institutions are almost certain to undervalue these necessities and thus there is a critical need for northern-based institutions that can produce local solutions for local problems. As a first step Scace and Wilson propose the establishment of a Northern Applied Technology Development Centre to be situated in the north. The centre would be primarily concerned with using technology to improve the quality of life for northern residents.

The papers by J.C. Stabler (Department of Economics and Political Science, University of Saskatchewan) and Dr. R. Riewe (Department of Zoology, University of Manitoba) are concerned with other aspects of northern engineering. Stabler's paper describes the use of economic modelling as a planning tool. As an example he discusses the possible consequences on employment, population migration and per capita income of several alternative development scenarios for the Northwest Territories. Riewe's paper stands as a reminder that hunter societies, like that of the Inuit, successfully developed a technology that was appropriate to their needs and a culture that provided both richness and diversity. It is southern needs that now place these traditional societies in jeopardy and southern hubris that seems to equate technological development with social progress. In Riewe's view we ignore the wisdom of these cultures at our own peril.

To conclude, there was much talk about institutions either stillborn like the Cold Regions Research Institute, newborn like C-FER, or pre-germinal like those of Drs. Pallister, Scace, and Wilson. Of the proposed institutes, it was Dr. Pallister's Northern Technology Communications Foundation that sparked the most discussion. If there is a contribution for the ACUNS to make, it is in the areas identified by Dr. Pallister: harmonization of the national effort and information dissemination.

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INSTITUTIONAL ADVANTAGES AND DISADVANTAGES IN MEETING NORTHERN ENGINEERING CHALLENGES

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When I was invited to participate in this annual conference of ACUNS, I had planned to report on a Cold Regions Research Institute to have been established in Edmonton by the National Research Council. Unfortunately, the institute became a victim of the Federal Government's need to reduce expenditures. Dr. Nelson then suggested I might speak on institutional advantages and disadvantages in meeting northern engineering challenges. On considering this topic I realized that I should consider carefully what is meant by "institutional" and tell you, my audience, the meaning I have assigned to it.

Of the four principal meanings of "institutional", the one most relevant with respect to meeting northern engineering challenges is "of, pertaining to, or characteristic of an institution". "Institution," however, has at least six meanings. Two appear to be relevant. These are:

- "a corporate body organized to perform some particular function often in education or research";

- "the art of instituting, establishing, or setting in operation".

The latter definition of "institution" is close to the meaning of the Latin word from which it is derived, institutus, past participle of instituere, to establish.

It is instructive to read what Fowler had to say about the word institution[1]. He states that "the two nouns, institute and institution, have run awkwardly into and out of one another. The neat arrangement would have been for institution to mean instituting and institute the thing that is instituted; but institution has seized, as abstract words will, on so many concrete senses that neatness is past praying for. Institution is in fact the natural English word capable of general use, and institute a special title restricted to and preferred for certain institutions. An institute is deliberately founded; an institution may be so, or may have established itself or grown". Hockey Night in Canada and the Stanley Cup playoffs, morning coffee break, the Senate, the National Library, marriage, and Parliament are examples of institutions, but not of institutes. What was proposed for Edmonton in support of engineering in cold regions was an institute. What is implied by the word institutional in "institutional advantages and disadvantages in meeting northern engineering challenges" clearly can be more than an institute. For this presentation I have chosen for my definition for institution "the art of instituting, establishing, or setting in operation", acknowledging that what may be established is an institute.

Consider now the matter of "meeting northern engineering challenges". Engineering is a knowledge-based activity. Experience over the past 20 years has amply demonstrated that the knowledge required for engineering in the North includes not only that associated with the engineering disciplines, but also that provided by the sciences (for example, geology, physics, chemistry, biology, geography, anthropology, and archeology) and by their use in seeking solutions to problems. It also includes knowledge obtained from studies of how engineering activity affects the environment and the response of humans, animals, birds and fish to those effects.

Much of the engineering in the North is carried out, or will be carried out, under conditions with which there is little or no experience. Extrapolation to these conditions from proven practice may not be appropriate or justifiable. What we are faced with is the development of the knowledge that is required, using the tools of science and engineering, and making it such an integral part of normal engineering practice that there will be no excuse for not applying it.

What role does the institutional process have in this? Consider an example that is quite relevant to northern engineering. Ptolemy, the Egyptian geographer living in the 2nd century A.D., must have been associated with an institution of some form to have had the opportunity to assemble the knowledge that he did, and to publish it. His accomplishments include the development of the grid system for cartography and possible invention of the concepts of latitude and longitude. Ptolemy's writings disappeared for centuries, as far as Europe was concerned. But they survived in Middle East institutions and began to reappear about 1400, along with some of his maps, and were translated from Greek into Latin.

In 1415, Prince Henri of Portugal was involved in wars in Morocco, and became aware of the vast fortunes that could be obtained from Africa. This led him to develop an interest in geography and the work of Ptolemy. He moved to the southwestern tip of Portugal, where he founded the town of Sagres. Sagres is the Portuguese translation of the name given to that extremity of Europe by Ptolemy. Prince Henri made Sagres his headquarters for 40 years and there he organized and commanded expeditions down the coast of Africa and finally around the Cape into the Indian Ocean. Boorstin, in his book "The Discoverers", states that Prince Henri's court was a primitive research and development laboratory[2]. Ptolemy's principles of mapping were vigorously exploited. Sagres became a centre for cartography, navigation, and ship-building. Ships that could sail upwind were further developed. Methods of measuring latitude were improved. Prince Henri's expedition leaders were required to make detailed notes of what they found in order to broaden the base of knowledge for future expeditions. As pointed out by Boorstin, "the ability to come home again was essential if a people were to enrich, embellish and enlighten themselves from far off places. In a latter age this would be called feedback. It was crucial for the discoverer..... The act without feedback was of little consequence. The capacity to enjoy and profit from feedback is a prime human power". Boorstin goes on to state that "while Prince Henri at Sagres did not actually build a modern research institute, he did bring together all the essential ingredients". What was compiled at Sagres became part of the growing body of knowledge that stimulated westward sailing and the resulting discovery of the Americas and the Northwest Passage.

The penetration of the Canadian North by ships began about one hundred years after the work of Prince Henri. Men such as Frobisher, Davis, Baffin, Hudson, Ross, and Parry recorded its channels and coastlines. On land it was men such as Hearne, Mackenzie and Franklin who undertook expeditions of discovery. Fortunately the institutional systems in the native countries of these explorers were strong and open, and their records have become part of history and are available to us today.

Many countries with northern interests have active institutions that attract the knowledge that should be preserved for cultural as well as scientific and technical reasons. These include England, Norway, Sweden, Russia, France and even Monaco. But what have we in Canada, a major polar country with about half of its land mass underlain by permafrost, that is comparable to the Scott Polar Institute, the Norsk Polarinstitut, or even the U.S. Corps of Engineers Cold Regions Research and Engineering Laboratory? What facility have we, blessed with sufficient national stature and financial support, that it has become a major storehouse of cold regions scientific and technical knowledge and motivator of northern research? We have some major discipline-oriented ones such as the Geological Survey of Canada, and the Bedford Institute of Oceanography whose work is very relevant to the North. The Arctic Institute of North America could play this role, but it may lack the appropriate national image and focus. Perhaps ACUNS could identify one or even two of its members as being in the proper location for a national focus, with the remaining members being part of an extended network. The task then would be to solicit the private and public support necessary to make this an effective, viable institutional system.

When one considers the growth and flow of knowledge that is possible through a continous institutional process, as illustrated by the development of cartographic and navigational sciences that played such a major role in the opening up of northern regions to begin with, it is difficult to find disadvantages of the system. Perhaps it is not the process for which advantages and disadvantages should be considered, but rather the ways in which the process can be carried out.

Institutions can have various forms. They can be either closed or open. Knowledge assembled by a closed institution is for the members only; that of an open institution is available to all. But even this can change with time; institutions may start on an open basis and gradually become restrictive, as was the case with some of the ancient trade guilds. Or they may be open or closed for only a period of their existence.

Institutions can be supported by public or private money, or both. The source of funding may determine the degree to which an institution is open or closed. The Canadian Institute for Steel Construction and the Pulp and Paper Research Institute address the needs and interests of their funding members. Results of some of their work may be proprietary and some in the public domain. Institutions supported by private funds may address initially the concerns of the funder, and gradually shift into a more philanthropic mode of operation, as in the case of the Mellon Institute. Institutions supported wholly by public funds would be expected to be open and to have a large measure of common interest in the matters they address.

The work of an institution can vary from solely verbal or paper transactions to the operation of extensive facilities. The balance between these extremes can change with time depending on the requirements of the subjects being addressed, the level of funding, the wishes of the founders and the preferences of the society in which the institution is established.

What are the desirable qualities of appropriate forms for meeting northern engineering challenges? In order to consider this, it is necessary to say a little about the objectives that these institutional forms should address. As mentioned earlier, engineering is a knowledge-based discipline, and the North poses conditions for engineering for which there is limited previous experience. Much of the knowledge required for northern engineering has to do with safety and desired performance. The interests of both the public and buyers of engineering services are best served if this knowledge is freely available to all. There must be nothing that hinders new knowledge from being evaluated and proven in practice. This is also in the best interest of the engineer, because engineering is a "state-of-the-art" activity. If a project gets into technical difficulty, the engineer responsible will be judged on the basis of whether or not he or she proceeded without adequate knowledge or was negligent or incompetent in the application of proven good practice. The engineer is expected to be fully abreast of the technical knowledge and practice that is applicable to the work being done, and to apply it. Those who purchase or regulate engineering services have the right to know the basis upon which the work is done. This requirement is covered by law in each province and territory.

After the discovery of oil and gas in Cook Inlet and on the North Slope of Alaska, industry interest in the North increased dramatically. Subjects that had been of only academic or scientific interest suddenly became the focus of industry information needs. The objectives of research and those of engineering studies overlapped completely. This is not uncommon. It has happened in the fields of chemistry and physics and is now actively occurring in biology. This overlap means, however, that something that previously may have been a matter for open scientific investigation now may be subject to proprietary interests. Activity is determined by the needs of the project rather than by the search for knowledge.

When engineering studies are funded by industry, quite justifiably those who pay for the studies may try to recover some of their investment through the sale of the results. Sometimes results may simply end up in a filing cabinet since publishing is not a required part of the process and money is not usually budgeted for it. Once a project has been completed, the owner is under no obligation to observe performance beyond that required by regulatory authorities. As consultants and engineering firms are often hired to do the engineering studies, the results can enter into practice, but in an ad hoc, limited and often infertile manner.

The institutional process involved here tends to be closed. The diffusion of knowledge derived from the work is slow and not subject to full and open scrutiny and professional evaluation. This is truly unfortunate as the knowledge often is relevant to safety and desired performance and ultimately should become an integral part of proven engineering practice.

On considering this situation, one could argue that the desirable objectives of applying the institutional process to meeting northern engineering challenges would be:

- to provide a means by which the results of engineering and other related industry and government funded studies could be assembled and evaluated;

- to identify gaps in knowledge that must be filled in order to meet the challenges;

- to seek the means by which the required knowledge can be obtained - and there are many ways that can be utilized;

- to make the knowledge readily accessible and actively encourage its incorporation into practice;

- to archive the knowledge so that it will be available to future generations when required.

An institution with these objectives would be open and should be funded by public and private interests as both would benefit from its work. The principal advantage of this system would be a growing body of proven technical knowledge that would benefit the engineering profession, owners of engineered works and the communities in which the works are located. The disadvantages would depend on how one viewed this open, institutional approach. A company may not wish to have information that is marketable made freely available in this manner; a consultant may view expertise associated with an institution as unfair and unwarranted competition; an institutional form may become out of date and even irrelevant. On the other hand, a regulatory body might be very supportive of the role of institutions in transforming new knowledge into standard proven practice.

How would the Cold Regions Research Institute that was proposed for Edmonton have satisfied the objectives stated above? There were five elements in the program that was to have been carried out. The main one was to undertake field performance studies and to apply the principle of feedback. This is a proven effective method for the development of engineering practice. Closely associated with this was to have been a program to develop measurement and analytical tools specifically for cold regions conditions. The Norwegian Geotechnical Institute has used this combination of performance observation and tool development very effectively to place itself at the forefront of world geotechnical practice.

There was to have been a group to evaluate published information and current practice, mine the store of information in government and industry files, place the knowledge so obtained into a readily accessible form, and act as technical information officers. Permanent groups were to have been established in the Yukon and Northwest Territories to conduct research in support of the engineering responsibilities of the territorial governments. They would have served also as technical information officers, providing a knowledgeable link with the Institute in Edmonton and with the Canada Institute for Scientific and Technical Information (CISTI).

The focal point of the institute was to have been its library, which would have been linked to the CISTI network and would have developed close working relationships with the libraries of university-based northern institutes, particularly the Boreal Institute of the University of Alberta, and the University of Calgary. Negotiations were in progress with the Centre for Frontier Engineering Research - C-FER - to provide a world class low temperature structural testing laboratory suitable for its needs. Space was to have been provided for thirty guest workers who could undertake their own programs using the facilities of the institute, or be part of an institute project. Within four years there would have been in the budget almost one million dollars to support outside participation in institute activity, and to ensure that even during periods of economic slowdown a base of expertise would be maintained ready to support the next wave of northern engineering work.

A board of directors was to have guided the evolution of the program and the development of relationships with universities and industry. One of the board's responsibilities would have been to ensure that the program was always consistent with the objectives of the institute. In time, the institute would have been supported by a mixture of public and private funds.

Conclusions

Is there now a need for an institutional system to support the growth of northern engineering? Economic development of the North will grow. This growth will maintain the need to acquire, evaluate and preserve the technical and scientific knowledge required to do this work safely and in an acceptable manner. To achieve this it would be highly desirable to have a national system that would complement what is now being done in other northern countries. History has demonstrated that an institutional system is a very effective way, and perhaps the only way to both obtain and preserve knowledge.

The word "institutional" is so flexible in its meaning that it should be possible to choose what is instituted so as to have very minimal disadvantages with respect to the achievement of desired objectives. The challenge will be to institute an institution with the qualities and advantages that will satisfy the needs of engineering in the North and the desires of those providing the funds. The system could:

- be responsive to the needs of engineering practice;
- be open and easily accessible so that the knowledge it acquires is freely available to all;
- be able to take advantage of opportunities for observing performance and to benefit from the process of feedback;
- have the means to prove the value of new knowledge and technology and to have that which is of value incorporated into practice;
- have a structure that will encourage and support the joint efforts of universities, government bodies and industry.

These are advantages that, if obtained, could truly make such an institutional system a national focus for meeting the challenges of engineering in the North.

References

1 Fowler, H.W. A Dictionary of Modern English Usage, Oxford University Press, 1949.

2 Boorstin, David J. The Discoverers, Random House, New York, 1983, p. 161.

THE CONSULTANTS' VIEWS ON ORGANIZATION AND POLICY IN NORTHERN ENGINEERING RESEARCH

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INTRODUCTION

The opportunity for a representative organization of the consulting engineering constituency to address the Annual Meeting of the Association of Canadian Universities for Northern Studies (ACUNS) is welcome and timely. Several benefits accrue to this occasion which are pertinent to Canada's North. Not least is the opportunity to present thoughts from a sector of the community occasionally perceived to be task- or problem-oriented, with limited time for or interest in broader contextual matters that include science and social policy formulation. While organizations such as ours must consistently focus primarily on economic viability, we believe an onus is upon consulting practitioners of all professions to facilitate information exchanges and dialogue that contribute to policy formulation.

A second consideration is to find vehicles whereby the experiences and thoughts of the discipline may extend beyond discipline-specific gatherings to directly touch many other constituencies - the academic community, governmental and private sector decision makers, politicians and other interested parties, including affected regional populations. The ACUNS is an important means for such exposure.

A third advantage to representation by a consultant is that our fraternity is a pervasive element in the community at large and increasingly may become so as the public sector deactivates inhouse functions and puts them to tender. Reid Crowther and its antecedents, for example, have been resident in Yellowknife for a quarter-century, providing a variety of engineering and other consulting services to northern communities, companies and residents. There is every expectation that the need for these services will grow in future as devolution, regional administrative structures and community and industrial infrastructures increasingly have application in the North. We will return to these matters in due course, but can note here that if one is to be a player in northern engineering activities one has an obvious, vested interest in organization, policy and research associated with such activities.

This presentation cannot speak for consulting engineers at large, neither does it seek to address Canada's North holistically. What we attempt to do is to draw on consulting experiences that focus principally upon civil engineering services and to a lesser extent on aspects of environmental engineering delivered mainly in the Northwest Territories (NWT). We have sought to distil the many comments received from colleagues and present them through the eyes of a consulting geographer and consulting environmental engineer, both of whom are active in northern research serving public and private sector clients.

Thoughts on organization and policy in northern engineering research may be appropriately prefaced by remarks on some of the realities associated with northern engineering today. Too often these realities are overlooked in the search for institutional arrangements, guidelines and strategies nurtured by concepts developed outside the North and having limited applicability to social, economic and environmental conditions in the northern territories.

ENGINEERING IN COLD CLIMATES

The northern territories present formidable challenges to implementation of engineering projects: these challenges include permafrost, adverse climatic conditions, long haulage distances for essential materials, insufficient on-site infrastructure, sparse populations, problems of acquiring skilled operators and the paucity of service parts. Northern environmental and social regulatory requirements must be borne in mind too. Collectively these factors contribute to increases in both project costs and lead time required from initial conception and planning and approval of the project through design, construction and operation. For example, barge traffic in the summer and winter roads are open only for a few months each year. If sufficient materials for one year's construction or operation allowance are not brought to the site during this transportation period, then the project may be delayed or jeopardized for a year. Thus planning must be at least 12 to 18 months in advance of similar projects in the south where transportation access to most sites is more easily achieved.

These realities suggest that facilities and associated infrastructures will support the following principal categories of resource developments and communities in northern Canada:

- large site specific resource extraction locales (mostly oil and gas in the NWT) with associated transportation arrangements;
- other, often isolated resource extraction sites with similarly ephemeral populations;
- permanent communities where survival seems assured regardless of government machinations and market place fluctuations.

For the first of these categories, systems must be in place for the transportation of bulk cargoes (i.e. railways, water routes, roads, pipelines, transmission lines and perhaps in the future, blimps). In the second category, where bulk transportation systems are absent, resource development in the North will be restricted to extraction of high unit value/low unit volume products such as gold, silver and uranium. The third category relates to the North's scattered permanent communities where a range of municipal-type requirements exist. Engineers must respond to the needs of these three categories. Currently the focus is very much upon the needs of the first and second categories in which remote and to a lesser extent on-site decisions are required about engineering solutions to facility development. In other no less important respects, engineering services will be principally directed to meet the needs of the North's scattered communities in terms of water supply, water distribution and sewage collection, waste disposal, solid waste management, fire protection, energy supply and management, airports and telecommunications.

Human resources available both to impart engineering designs and to implement and operate projects present related problems. Most professional engineering capability used in northern work is provided either by a population whose residency in the north has pronounced ephemeral characteristics, or is drawn from the human resource pools available in southern offices of resource development corporations, consulting engineers and the like. At the implementation end, there are recurring difficulties with aspects of project construction and operation. Design must be explicit, timing of on-site inspections judiciously selected and a weather eye maintained for emergency replacements of construction parts. Few return trips from Yellowknife to Pond Inlet, for example, at $2,500 per trip, are required to escalate project costs well beyond original estimates!

ORGANIZING THE ENGINEERS

Internal organization of engineers in the Northwest Territories is of recent vintage. In February, 1979, some 30 years after the first water and sewer lines were laid in Yellowknife, the Northwest Territories Association of Professional Engineers, Geologists and Geophysicists (NAPEGG) was established. By Februrary 1985, NAPEGG had grown to the following numbers:

163 members (remain a member if transfer outside the NWT)
182 licencees (outside NWT)
11 members in training
71 permit holders (company stamping: inside and outside NWT)

While still a nascent organization, NAPEGG is moving from building its membership to the formation of various committees required to conduct association business and enforce the Ordinance. However, distinctive statements or judgements on engineering research generally are yet to emanate from this group: in time policy statements may be expected.

SOME PERCEPTIONS AND PRACTICES ASSOCIATED WITH ENGINEERING RESEARCH

We enquired of our colleagues what relationship they saw between their consulting work and research projects or the products of research. Their responses are illuminating and suggest that while "high-tech" solutions are vital to sectoral advances such as oil and gas production, a spectrum of design solutions are required in the North. To quote one source, an engineer practising in several northern communities in a six-year period during the 1970's:

> "My time living and working in the north was 1973 to 1979. During that period I did not become aware of very much previous or ongoing engineering research that was of any help to our type of engineering projects. Those projects were water, sewer and storm drain pipe lines, telephone ducts and vaults, and roads and sidewalks built in and over rock and soil that were thawed or frozen permafrost, some of which were ice-rich and some of which were not.

During that period I recall that the federal government carried out one research project ... for testing the treatment of sewage under some variety of northern conditions.

During that period about $50 million was spent by a consortium of petroleum companies on "engineering"-type research into problems to be expected (and solutions to same) if a petroleum pipeline were built along the Mackenzie Valley. However, the results of that research activity were not readily available to those of us who were already designing and building pipelines in similar conditions, but to carry heated domestic water and sewage wastes instead of petroleum products.

That research expenditure probably confirmed what we and others had learned over the years by trial and error:

- permafrost soils will probably thaw if disturbed;
- it is very hard to work in permafrost soil without disturbing it;
- if not ice-rich, thawing does little harm to the pipelines or road;
- if ice-rich, thawing produces "soup" and if the "soup" escapes it produces settlement;
- thawing may be slow, so settlement may take a long time;
- rate of thawing is not necessarily uniform, so in consequence settlement may be non-uniform;
- thawing of non-uniform thickness of ice-rich material can cause another form of unequal settlement;
- unequal settlement is usually the worst problem; and
- ice-rich versus non ice-rich can quickly be identified by thawing a chunk of frozen trench excavation material in a plastic bag under hot water tap in sink in house. If you get a bag of "soup" you have to rush back to trench, develop an on-site cure such as more subcut, more broken rock bedding, more insulation, or more pipe joints."

Other, similar comments were received, remarks which acknowledged the need for research, but which stressed that at the "hands-on" level and even after years of exposure to specific aspects of northern engineering, the need remains to define local solutions to local problems. (There is in this a sound lesson both for advocates of high risk, capital intensive projects and critics sensitive to northern environmental and social issues who argue for foolproof methodologies before project inception).

These observations would seem to be somewhat at odds with the reality of some very innovative, indeed world-leading research exercises and associated products that are tied to sectoral thrusts in the North. Obvious examples which come to mind are marine engineering research associated with oil and gas development, to be followed no doubt by the products of high technology, domestic or imported, associated with the forthcoming North Warning System (the DEW line replacement). However, if one withdraws from these incredibly expensive examples of "high-tech" engineering there seem to persist opportunities for work in the "low technology", cold climate engineering field. In 1979, for instance, the United States' Environmental Protection Agency in discussing Cold Climate Utilities Delivery in Alaska and Canada, noted:

"An evaluation of the present level of sanitation in most of the smaller northern communities shows that the overall situation is more primitive than in comparably-sized southern communities, but that the situation is steadily improving. Implementation of goals will, to a large extent, depend on available funds.... The engineering community must be ready to plan, design, construct and operate facilities appropriate for the conditions encountered."

In 1984 NAPEGG put the situation more succinctly: "major improvements have yet to be made to bring all the communities of the N.W.T. to a desired minimum standard for water and sanitation as the "honey bag" is still widely used." Indeed one is tempted to argue that the image of the artificial offshore island with accompanying drilling rig on one hand and that of a multiplicity of honey bags lying cosily together on the other succinctly demonstrates the challenge in structuring meaningful statements about northern engineering research in a holistic or policy sense.

THE BUREAUCRACY

The tangle of interweaving federal and territorial mandated responsibilities and accompanying acts and regulations is well known and has been amply demonstrated in publications of the Canadian Arctic Resources Committee and others. In instances of applications for development, for example, the situation may be frustrating and costly. Not infrequently the consultant is caught firmly between proponent and decision-maker; often he acts as both conciliator and devisor of techniques and standards essential to resolution of an impasse. One of us describes his situation as follows:

"In my experience regarding an amendment to a Water Licence for a mine, all submissions and contact were coordinated through the Water Board set up under the Northern Inland Waters Act and administered by Indian and Northern Affairs. On the surface this provides a convenient single-point interface between the proponent's representative and the regulatory authorities; however, there is a sponge-like inertia built into this system.

The Department of Indian and Northern Affairs has its own water resource group which is interested in water quality. Also interested in water quality are Environment Canada and Fisheries and Oceans. An application gets circulated to members of all three departments for comment. To someone on the outside looking in, there is a perceived overlap of jurisdictions and responsibilities. This wouldn't be so bad if they all pulled oars in the same direction, but when one department suggests moving the very goal-posts toward which all parties have been striving over a period of several years, it presents an unusually difficult situation to deal with, particularly for the project proponent who is caught in the middle. It is suggested that the various government departments get their acts together in private before such differences are brought to light when dealing with either the proponent or the public.

> The bureaucracy also is susceptible to delays in producing a meaningful response within a reasonable time frame when asked a question or reviewing a submission. This is particularly critical in the north where the transportation and construction seasons are so short and decisions must be made quickly. Part of the problem is the apparent overlapping jurisdictions noted above, but this is compounded by a high turnover of staff - particularly in the junior and intermediate ranks where a lot of the technical day-to-day work gets done. In addition, many of the staff are young and inexperienced. Often reports and other submissions are circulated to more senior people in Ottawa or elsewhere for comment before a response is made. This is another cause for delay. The remedy would be to attract more senior experienced personnel to the north and invest an appropriate degree of authority in them."

We cannot offer any instant solutions to the situation insofar as it relates to consulting activities, but we do find intriguing the idea that a permanent committee or some such device be developed between engineering consultants and the Northern bureaucracy to address these kinds of concerns. NAPEGG might be one vehicle for private representation on these matters.

THE FUTURE

A generalized future for the North, for the Yukon's 24,000 or so residents and the 45,000 or so in the N.W.T., suggests a continuing investment by diverse bodies in civil and other engineering fields in the pursuit of resource site developments, linear transportation linkages and community development. Incentive for such actions will come not only from the private sector pursuing non-renewable resource opportunities, but through government and community efforts as devolution of political power takes place, as the N.W.T. is divided into two distinct jurisdictions and as the development regions and communities of the Western Arctic and Nunavut embark on infrastructure improvements through expanded municipal-type responsibilities. All of this suggests the need for strategic arrangements to conduct research, facilitate training and communicate results with respect to provision and development of engineering services. Some structure to policy and practice should produce a number of benefits impacting directly on engineering, but coincidentally benefitting the community at large. A sounder institutional base for engineering would encourage permanent residency of qualified and capable professionals, encourage a more secure basis for public and private engineering practice and facilitate both information exchange and the systemizing of standards and practice. These arrangments would of necessity require support and commitment from southern constituencies interested in the North. However, this support would have to recognize and actively work toward strengthening the role of indigenous engineering in the Territories. An opportunity is presented to the member universities of ACUNS and other organizations (e.g., Centre for Frontier Engineering Research, Centre for Cold Ocean Resources Engineering, and Canada's professional engineering societies) to endorse and support these initiatives.

Useful contributions to policy formulation might include some ideas listed below. The ideas are not new. Their appearance once more, however, should be cause for endorsement rather than disinterest. They represent a few fundamental pieces essential to upgrading the northern engineering jigsaw.

A Major "Futures in the North" Engineering Technology Symposium & Follow Up

Meaningful change takes place only when all the key actors push for it or are prepared to accept it. A series of position papers prepared for a well-planned symposium, sponsored again by the key players, is a useful starting place. From it can emerge directions, ideas and so on eventually to be worked into white or green papers and so into policy. These things can be worked out in different ways of course. For example, a resource compensation study by a consultant now on our staff was the impetus for the current Government of the Northwest Territories (GNWT) renewable resource compensation policy. Likewise a major Reid Crowther study on hazardous wastes completed some time ago gradually is having some of its recommendations implemented in various ways by the federal, provincial and territorial governments. And the Canadian Assembly on National Parks and Protected Areas, a major National Parks Centennial initiative, in seeking prescriptions for heritage use and conservation in Canada, is the start of a process for which certain post-assembly strategies are being developed at national and regional levels.

These examples attest to the need for a symposium on northern engineering technologies and directives to carry with it commitments to implement, in some way, key recommendations flowing from participants' deliberations.

Northern Applied Technology Development Centre

There is a need for a fully-staffed, multi-disciplinary technology centre located in the North. Ideally it should be oriented towards Demonstration and Development activities rather than Research and Development initiatives. It could focus on the application of technology for the growth of northern infrastructure, northern economy and northern residents' capability to serve, for example, as skilled technicians and potentially, through university extension, as engineers.

Considerable focus would be placed on the application of both fundamental practical applications and transfer of advanced technologies appropriate to cold climates.

Areas of interest for the technology development centre could include: transportation; communication; energy; resource development and waste management. As both public and private sectors would derive benefits from this arrangement, presumably both capital and O and M costs could be drawn from each sector. Some rearrangement of the allocation of current royalties and other procedures may be a start. Benefits would include:

- more appropriate technology transfer;
- potential for employment of northern residents by agencies, corporations, consultants;

. potential links to established engineering facilities in southern Canada; and
. clearing house for technological information on the North.

Having proposed such an initiative we confess sensitivity to the fact that proposals of similar ilk surface with the regularity of summer's black fly. However, some good must be attributable to the thought if so many sound minds attest to its merit! One fundamental caution must be exercised. The resources and opportunities to implement such a centre are limited. Already moves are afoot to implement a Science Institute following passage of a GNWT Act in 1984. And there is apparent interest in research facilities associated with public works in the N.W.T. Similar thinking of a more prescribed nature prevails in the Yukon where the Yukon Science Institute was recently formed and registered. According to Yukon Update:

> The founding members of the Yukon Science Institute are also concerned not to be confused with various proposals presently floating here and elsewhere about a northern research centre.
>
> The Yukon Scientific Research and Data Information Centre envisaged in the institute's constitution is intended to identify and make accessible, through electronic or other means, existing and future scientific data. it is not presently intended to provide a laboratory or other physical base for research works and their projects.

In these circumstances of heightened activity respecting northern science and technology, the merits of symposia and other means to identify goals and parameters for such a facility or facilities become rather obvious.

Strategic Organization with Native Development Corporations

The future holds the likely prospect that growth will occur in the number of native development corporations actively engaged in community and regional projects. These corporations hold the prospect for innovative means whereby local residents may receive on-the-job training as part of package arrangements worked out with project developers and the regulatory authorities. Some useful examples already may be at hand in respect to the Beaufort Sea and Esso's strategic planning at Norman Wells. Initiatives such as planned programs for enhanced self-reliance in cold climate technologies will serve to break the pattern of overwhelming reliance on external manpower to design and implement a range of engineering functions.

Technology Transfer Among Discrete Populations

The forthcoming division of the Northwest Territories, the enhanced responsibility of each community for administration of its own municipal infrastructure and future site specific developments associated with resource developments together suggest a much greater distribution of initiatives in project implementation, including engineering functions. Gone may be centralized pools of expertise in such as Departments of Public Works and accordingly greater will be the opportunity for trial and error technology on a site by site basis. An early future need would be for the GNWT in concert

with others to find ways to effect technology transfer between communities through reinforcement of standards and methods, and demonstration of "good example - bad example" cases. In many communities existing systems are notoriously fickle and further loss of efficiency could impose greater human discomfort, associated works remedial costs and impairment of fragile environments.

Cultivating a Northern Engineering Consultancy

As in so many other situations in the N.W.T., private sector consulting is in a phase of rapid change. A key ingredient in this is the institution by GNWT of a rather ill-defined northern preference policy for awarding of engineering commissions. While sound in principle, in execution the policy appears to suffer from the hybrid arrangements so often associated with the umbilical cord to southern Canada. By stating that organizations must have a "northern manager" the policy provides for what may be little more than storefront operations, whereby the opportunity and the benefits flow south. As even well-established northern consultancies must rely to some extent on southern professional input, careful reappraisal of northern residency policies is desirable.

One may tie to this all sorts of ancillary thoughts including incentive arrangements, residency requirements and the like, but in future the goal must be to encourage a sound level of private engineering capability in the north which feels relatively secure in setting roots and developing traditions.

In closing we would reiterate the need to constructively involve that "pervasive element", the consultant, in securing strategies for engineering initiatives. He is a vital link in a chain which extends all the way from the best funded and equipped cold climate research facility to the operation and maintenance of plant on the ground.

ACKNOWLEDGEMENTS

We wish to acknowledge contributions of Reid Crowther staff to this paper. In particular we wish to thank Bob Boon and Ben Van Hees.

AFTERNOTE

Periodically documents appear which focus on scientific and technological research needs, strategies and the like for Canada's North. One recalls, for example, the Arctic Institute of North America's Arctic Research, The Current Status of Research and Some Immediate Problems in the North American Arctic and Subarctic (1955); the Government of Canada's Science and the North, A Seminar on Guidelines for Scientific Activities in Northern Canada 1972 (1973); or the more recent (1983) Applied Research in the Canadian North (F. Duerden, ed.), published by Ryerson Polytechnical Institute. A valuable exercise in determining preferred futures for science, technology and engineering in the North would be to review and evaluate this and other literature to identify the flow of ideas, to assess their worth and success and to relate them to some of the strategies suggested in this paper. Such a resource tool would well serve the community at large; and ACUNS is encouraged to sponsor such an initiative with the intent of presenting its findings at the next Annual Meeting in Yellowknife.

THE INTERFACE BETWEEN ENGINEERS IN INDUSTRY AND THE EDUCATIONAL SYSTEM AND FACILITIES*

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I undertake this speaking assignment with great pleasure. It gives me the opportunity to express some thoughts on an important subject. I am especially pleased by the way it has worked out this morning, my being preceded by Dr. Gold who talked about the problems of disseminating information to assure that engineers are well-informed during the performance of their tasks. Also, I thought it was very helpful for us to have Dr. Peter Adams' organization, C-FER**, explained so clearly, and to hear of the importance he is placing on communication through his Networking Program.

In addressing the subject of the interface between engineers and the educational system, I'd like, also, to make a couple of definitions. I isolate "engineers" because it is the engineer who is the person who has the opportunity of, or even responsibility for, translating all preparatory planning and research, whether it be engineering, socio-economic or biological, into practices which will have meaningful impacts on our society. In "the educational system and facilities", I restrict my comments to the contacts with northern research organizations that transpire externally to the direct work of an engineer. It is this tapping into the wide educational base that can result in him or her exercising the required good judgement. So if you permit me to use those very broad definitions, I will proceed within this session on Organization and Policy with some views on the "interface".

I will be brief in stating my views, because I want to leave you with a recommendation for discussion. I am motivated, in part, by your comments, Mr. Chairman, following Dr. Gold's presentation as to what actions should be taken in the near term.

INDUSTRY'S NORTHERN INTERFACE

Let's look at the interface between the engineer in industry and the outside world, in the context of the Canadian North. As I see it, today there are two very distinct types of development on the horizon. One is social and political development, a very complex subject. The other is economic development. Although the latter ties in very closely with the former, I will restrict my remarks to economic development.

I will narrow the scope even further to the development with the potentially largest impact. That is, if it occurs, the extraction of oil and gas from northern Canada and its transportation to the outside. This is, by far, the major possible commercial activity. The past three decades have been a time during which the petroleum industry entered the North, evaluated the

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* This is an edited transcript of Dr. Pallister's address.

** See paper which follows

unique operating problems and developed technologies and techniques to work in a manner that protected the operations from the environment and protected the environment from the operations. During this period the companies also addressed the many socio-economic concerns of the local populace. Today, it has been illustrated that these three interfaces are under control.

PETROLEUM EXTRACTION

We are now entering a new phase - the extraction phase encompassing development, production and transportation. While these new activities will be largely extrapolations of technologies developed during the exploration phase, there are some differences.

The most significant difference is that there is a much greater degree of flexibility in conducting exploration. The operator can work in the summer, or if that's not the ideal season, he can work in the winter. If one work site is unavailable, he can move to another. When it comes to producing oil or gas, he must work year-round and at a specific location. This introduces many new technological requirements. An important factor that must be taken into consideration is that the excellent equipment and systems which were developed, were immensely costly. The most expensive well drilled in the world is in the Beaufort Sea - $150 million for a dry hole. The challenge now is not only to work on-site permanently, but also to do so economically. Most of the petroleum is located offshore in ice-infested seas.

Petroleum from the Canadian Arctic has to compete in the marketplace with oil from Venezuela, Saudi Arabia and elsewhere in the world, and with natural gas from southern Canada. Unless there is a conviction that those supplies will not be available in Canada at reasonable prices or available at all, it is difficult to reason how petroleum supplies from such a remote, difficult and costly operating area can be developed.

Our position today is one in which we have the technical capability in this country but the operations are very costly. So, there is some question of whether the commercialization of the discoveries is realistic. If arctic petroleum extraction is commercial, operations must be carried out with extreme safety. By virtue of the social fabric of the North, safety is of greater importance than normal. An offshore oilspill, for instance, would have a severe impact on the residents because of the difficulty of cleaning it up in icy waters, and also by virtue of the fact that local people depend very much on a clean ocean for their food and livelihood. Increased safety measures introduce increased costs, so the challenge to the engineers is to devise new systems and operational procedures that will make arctic oil and gas competitive with other supplies. That will be accomplished, if it is accomplished, through research and development.

NORTHERN RESEARCH ORGANIZATIONS

Addressing the technical requirements of the North has been a Canadian obsession, if not a hobby, throughout history. Today, there are over a hundred individual institutions and organizations in industry, in government and in university. In ACUNS alone there are thirty-four universities represented, half a dozen of them very active in technical pursuits. In the petroleum industry, there are about a hundred companies with holdings in

northern Canada, and there's an army of contracting companies, suppliers and consultants serving their needs. In the federal and provincial governments, there are several departments and numerous agencies conducting northern research.

To illustrate the breadth of organizations that have been established and to make the point of how complex are the interfaces, I mention just a few which come to mind. In the universities there are ACUNS, C-CORE, C-FER, the Arctic Institute of North America and the Boreal Institute. In industry there are the Arctic Petroleum Operators' Association, the Offshore Operators' Division of the Canadian Petroleum Association, and numerous trade associations which address northern technology. In government, in the North there are the Science Institutes of the Northwest Territories and of Yukon, and the Arctic Research Establishment, and federally there are DIAND, MOT, DND, NRC, NSERC, EMR, MOSST, the Environmental Studies Revolving Fund (ESRF) and the Science Council. In education and public interest, there are the Arctic College, the Yukon College, CARC, COPE, ITC, DIZ Society, and the Dene Nation. If a complete listing were made, it would be astounding to see how many groups in Canada are pursuing the same subject often with the same objective or common goal.

We can conclude from this that the northern knowledge base and capabilities in Canada are immense. And, I suggest we can also conclude that, as a nation, we are not adequately and properly organized. How can we do a better job? The answer, I think, is obvious - we need to establish a means for increased coordination and communication.

SHARING INFORMATION

Before developing a recommendation, let us examine what interfaces now exist. It's important to recognize that the transfer of information is the key element on which to judge our efficiency. The situation is not as serious as might be inferred from my description of redundant organizations, nor possibly not as closed as Dr. Gold has indicated. There are many mechanisms by which communication is effected in this country. Our being in this room today is one of them. The ASTIS program of the Arctic Institute, for instance, brings together certain information from industry and government and makes its existence readily known. I'm sure the Institute would like to have more people access it. The problem is not so much one of information not being available as one of people not using the data that is available to them. To a large degree, this results from a lack of knowledge of what is available. Also, there are constraints on distributing data.

The Network Program of C-FER is another example of central communication. In this case, it is an attempt to get all parties with a common interest talking to each other. The first step has been to simply assemble an inventory of the key people and their projects. At the Boreal Institute, and at Memorial University at C-CORE and the Ocean Engineering Information Centre, a great deal of work is being done in assembling information and making it available. The Arctic Petroleum Operators' Association (APOA) releases its research reports, places microfiche in libraries, and publishes reviews. The APOA and the Offshore Operators' Division of CPA conduct annual workshops which are open to researchers outside industry. The Northern Development Conference which takes place in Edmonton results in a great deal of cross

fertilization.

There are also technical sessions. NRC is sponsoring one next week on ice engineering. Next week too C-FER and the Arctic Institute are bringing together information specialists and some users in Canada and the U.S. to discuss their services and problems. And, there are the numerous technical conferences of professional associations. Public enquiries and hearings assemble a great deal of information and sponsor considerable debate. The proceedings of the Senate Committee on the Northern Pipeline is one of the best sources of information on northern development. The Royal Commission on the Ocean Ranger Disaster not only published its findings, but also the twenty background studies. It assembled a large specialized library which has been kept intact in Newfoundland.

The point I make is that there is not a conspiracy to keep data secret, but rather an absence of a coordinated mechanism to make sure it is known and disseminated. There are proprietary reports, of course. Companies conduct their own specialized studies and treat them as internal information as a normal part of their business. Much of this information finds its way into the public domain through papers in professional journals and in submissions to government regulatory agencies and review panels. Beyond that, studies can be acquired by cost-sharing and, I believe, with discussion and negotiation much more of these type of data can be made available.

This rather informal system provides a reasonable interface of the engineer in industry with the outside world. The engineer does have access to the work of others, and others have a fair opportunity to influence him or her. But, is it good enough?

ESTABLISHING RESEARCH PRIORITIES THROUGH COLLABORATION

As a nation, Canada should surely be foremost in northern technology. It can be. Having performed, we have the expertise and in many respects we have established world leadership. I believe it is time to go the next step in maintaining our advance position, by showing leadership in communication and coordination. There are three requirements in taking that step. First is the harmonizing of the initiatives within each of our sectors. I am referring to the university, industry and government sectors and calling for a harmonization within each. Second is the ascertainment of the objectives, specialties and activities of each and every group. And third is the reduction of redundancy to optimize our authority of knowledge. The target is to increase the specialization and collaboration. This means not only eliminating overlaps but also finding gaps that need to be filled.

It may be easier said than done in an individualistic society. The mechanism for doing it is an organized dissemination and exchange of information. We have the proper organizations in Canada but their interrelationships are haphazard. I certainly agree with the earlier speaker who said it's not just the availability of reports that is critical, it's people coming together face-to-face.

Information dissemination (using the words in the broadest sense) is a vehicle that will assure that individual priorities now determined somewhat in isolation are, in fact, the correct ones. Don't interpret that to mean that

there should be no "curiosity" research, or that all northern interest should be directed towards the safe delivery of gas and oil. I don't mean that at all - but I do think it is the responsibility of all to know what is being done by others. Otherwise we are not exhibiting professional stewardship in the use of funds allocated to us.

CANADIAN NATIONAL NORTHERN STRATEGY

This coordination, together with information transfer, is visualized as the most important component in identifying a forward-looking Canadian national "northern policy". You might wonder about my use of the word "policy" in that sense. Normally, we use that word in the expectation of governments fulfilling their responsibilities. Over the years, we have found the practice of northern policy to be a very nebulous exercise and we risk seeing it continue in the future to be like a star in a luminous haze. Policy needs to provide a clear sense of direction as to where we're going and for what reason - the precipitation of a consensus from past debates. If you take that definition of policy, it needs to be developed with the consultation efforts of Canadians who have an interest and knowledge of the North, rather than leaving it entirely to governments. I am proposing that this northern policy be established in a pragmatic way through its enunciation by those who will be called upon to implement it.

With a new northern policy, or better, a focused national northern strategy as described by others here today, Canadians will then be in a position to provide leadership in international northern affairs. That may be presumptuous, but there is no reason why we Canadians can't put our own house in order and then enter the international field to work aggressively with other nations and their institutions. There are about twenty good-sized northern institutes in the U.S., U.K., U.S.S.R., Norway, Sweden, Finland, France, Monaco, Switzerland and Denmark. Here again, they are not communicating particularly well among themselves; my impression is that they are all going in their own individual directions. There is no international organization effectively drawing upon the worldwide talents of northern experts. We share these special northern conditions and the responsibility for the animal and sea life, and the air and water that moves throughout the boreal countries. And, we are going to experience the impacts of each other's industrial development. Does it make sense that we should work together more closely?

In speaking on the subject of the engineer's interface with the societal education system in the context of northern organization and policy, I hope that I have stimulated a concern on your part which will lead to a discussion of how the ACUNS can participate in an improvement to the present fragmented system in Canada.

NORTHERN TECHNOLOGY COMMUNICATIONS FOUNDATION

To launch such a discussion, I offer a very simple formula. Notwithstanding my criticism of our having too many organizations, we need to form one more! That one-more is an organization to coordinate our domestic endeavours. Perhaps it could be called the "Northern Technology Communications Foundation". These are simply words that come to mind - there are undoubtedly better ones. But what this organization would do is what is

important. It would be something like ACUNS. It would be made up of representatives of existing bodies, in other words, an organization of organizations with the particular mandate of closing the loop. Its formation and operation would be a simple matter of calling upon existing financial and human resources that are presently being inadequately deployed.

It would be not a matter of starting from scratch nor of requiring a lot of money. It could be funded by the member organizations, some of which I referred to earlier. It would include all those identifiable groups which are undertaking analyses of responsible development in the North from different perspectives. I have used the word technology in the name, indicating a focussing of its mandate to some extent. Its goal would be to achieve among the members the consensus I mentioned earlier. The determination of that consensus would provide the keystone for the formulation of a Canadian national northern strategy.

Its work should be informal rather than official, and it would be an organization which all parts of society could respect and believe. By bringing together all the interests which today have somewhat different and sometimes restricted viewpoints, a bridge to greater understanding and appreciation will be construed. In time, when representatives comprising this organization meet as we do today, their motivation will be to integrate the capabilities and concerns of all in the design and performance of the very best northern development technology and practices. Representatives will become unidentifiable as they serve as individuals dedicated to the new organization's important task.

When running smoothly, the NTCF (I feel obliged to give it an acronym) might act then as an initiator in drawing together other national organizations into an international association with similar ideals and founded on information exchange. This would lead to a comprehensive international northern data bank that is easily accessed via a common network using existing sources. The use of information is very important, so it is more than simply creating an aggregate collection of books on shelves. It is a concept to facilitate the movement of knowledge and ideas through personal contact. Then, we could all be more confident that engineers in industry have at their disposal the total and rich resources of the entire "educational system" in their enhancement of responsible and responsive engineering decisions.

C-FER; CENTRE FOR FRONTIER ENGINEERING RESEARCH

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INTRODUCTION

C-FER; Centre for Frontier Engineering Research, is the result of collaboration among industry, governments, universities and foundations. The Centre was established to provide research information related to materials, and design and construction processes for arctic and offshore structures.

In August, 1981, representatives of the steel industry approached the University of Alberta to discuss the initiation of research related to arctic and offshore developments. Toward the end of 1981 and into 1982 representatives of these organizations and others met to develop the framework for a research centre. They were encouraged in this effort by the Devonian Group of Charitable Foundations of Calgary.

By November, 1983, the Devonian Group was satisfied that the conditions necessary to ensure firm financial and technical foundations for the centre had been met and committed funding to C-FER in accordance with a plan for overall financing. This plan required significant contributions from the University of Alberta, the Government of Alberta and the private sector.

C-FER was incorporated as a non-profit company in November, 1983. In April, the organization opened its doors in temporary offices and in June moved to a 2400 square foot, metal clad, building on the University of Alberta Campus. Access to laboratory facilities, computer services, support personnel and active researchers are some of the advantages C-FER enjoys with a campus location.

The catalyst behind C-FER is the Devonian Group of Charitable Foundations. C-FER joins C-CORE, the Centre for Cold Ocean Resources Engineering, and VIDO, the Veterinary Infectious Disease Organization, as the third Canadian research centre to benefit from the foresight and commitment of the Devonian Group.

In addition to the Devonian Group and the University, other organizations providing early support are:

The Goverment of Alberta
The Government of Canada
The Algoma Steel Corporation Ltd.
AMCA International Limited
Bow Valley Industries Ltd.
CanOcean Resources Limited
Dome Petroleum Limited
Gulf Canada Resources Ltd.
Hanson Materials (Western) Ltd.
NOVA, An Alberta Corporation Limited
Stelco Inc.

C-FER's major activity is its "core" research program; the program supported and directed by all member organizations. C-FER also performs contract research and has established a "networking" program - a program aimed at sharing information among those organizations having an interest in offshore and arctic development.

C-FER has grown to fourteen full-time staff members over the past nine months. The staff are responsible for the networking and research programs and handling the associated administrative matters. For the first full year of operation, 1984-85, the operating budget is approximately $650,000, while by 1989-90, the budget is expected to grow to approximately $1,200,000.

BOARD OF DIRECTORS

C-FER is governed by the nine-member Board of Directors listed in Appendix "A". The Board is responsible for all matters of policy related to the operations of C-FER. This includes responsibility for financial affairs and for the direction of the networking and research programs.

Research Program Direction

The Board's principal responsibility is to establish the direction and major thrust of C-FER's research programs. In discharging its responsibilities in this area, the Board receives advice from the Research Policy Committee. The Research Policy Committee meets three times a year and the Chairman (who is a Member of the Board) is in frequent communication with C-FER on research progress. At meetings of the Research Policy Committee, policy issues are considered and directions are formulated for later presentation to the Board. Formal presentations on the research programs are included in the agenda for each Board meeting (three per year) and written progress reports are delivered to Board members at mid-points between meetings. The organizational chart is outlined in Figure 1.

A Technical Council meets twice annually to review the technical content of the active research programs. The review considers the scope of the program, progress on each project, the scheduling, staffing, etc. The Technical Council is chaired by a member of the Research Policy Committee and thus is linked to the Research Policy Committee and the Board.

Individual Project Committees are formed to guide each project. Wherever possible, Project Committees are chaired by members of the Technical Council; each such committee is responsible for providing detailed technical advice for C-FER staff when formulating and persuing the project. A Project Committee may meet fairly often during the initial phase of a project and then may meet less frequently as the project proceeds.

NETWORKING PROGRAM

The networking Program was established to assist in improving the competitive position of Canadian organizations that construct, design, or supply materials for frontier facilities. C-FER's role in this process is that of an easily accessible information centre; providing an independent assessment of research and other technical information; facilitating exchange of views; and improving coordination of R & D efforts.

To achieve these aims, C-FER has attempted:

a) to establish personal contacts with representatives of network members.

The past few months have seen an intensive push to establish initial contacts with those organizations working in offshore development. This activity will eventually be reduced to a maintenance level. The personal contacts are supplemented by a networking newsletter (the "Networker") which is published regularly throughout the year.

b) to develop a series of workshops on specific technical topics.

Plans are underway for the first session, scheduled for January, 1985, to focus on the technical information required for welding plate used in low-temperature environments.

C-FER'S RESEARCH PROGRAMS - ORGANIZATION

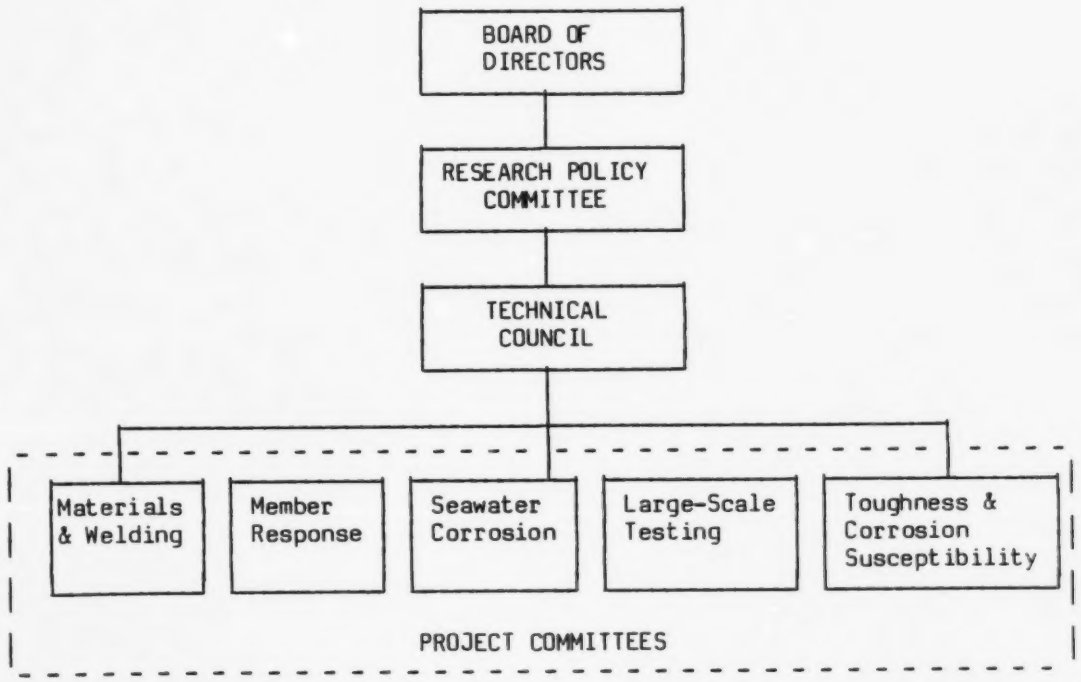

FIGURE 1

c) to disseminate information regarding the offshore industry to all parties interested in related developments.

The First C-FER Annual Report and an introductory brochure were published in the summer of 1984 and provided a start at "getting the word out". As well, Frontiers, a quarterly forum and Networker, a monthly update have been initiated. Both focus on northern resource development and are vehicles of information about what's happening in industry, not just at C-FER. Information is shared through media relations efforts as well. News releases, feature articles, regular contacts with members of the media are a part of C-FER's on-going effort. To date media attention to C-FER has been good and feature stories have appeared in a wide variety of publications right across Canada.

d) to establish an information service to assist network contacts.

In terms of information services a basic decision was taken that C-FER will not attempt to develop a full-service electronic database since 660 are already publicly available. Rather, C-FER staff will attempt to become expert in the use of the 4 or 5 key databases particularly relevant to offshore and arctic development. Highly specialized information will be collected and stored, if unavailable elsewhere.

RESEARCH PROGRAM

C-FER's research programs form the major thrust of the Centre. The initial core programs were established after an extensive survey of the needs of C-FER's supporters. The programs have been carefully considered by the Research Policy Committee and the Board and detailed technical input has been provided by the Technical Council. It is fortunate that these groups contain representatives of product users - the operating oil companies, steel producers and fabricators, engineers, designers and contractors, other research performers, and regulators. Thus C-FER has the benefit of an extremely wide spectrum of advice.

One program - to which the Centre devotes about 40% of its research effort - deals with downhole tubular products. At the present time the program is engaged in determining the specific downhole conditions experienced in frontier locations. In addition, surveys of the products available and the reported failures and difficulties have been initiated. The object is to isolate specific and significant problems that restrain frontier development - and to develop research activities to meet these problems.

The major research program, however, is focussed on the design of steel structures for the Arctic. Outlines of the projects included in the program are contained in Appendix "B". These structures are designed for extremely low temperatures - in some instances -60°C, to resist massive ice features - moving at some speed, and utilize structural forms and details that are unique to arctic offshore development.

For structures used in normal environments the design procedure is well established and is sensitive to the properties of the steels and weldments used; the structural arrangement, the loads and associated dynamic effects, the sharing of the loads among the structural elements, etc.

By contrast, for low temperature environments where the possibility of brittle fracture is a lurking menance, the design approach throws total responsibility on material selection. The steel is selected on the basis of its toughness or fracture resistance, the welding consumables and procedures are selected for maximum toughness - and at this point the process breaks down.

The C-FER program will attempt to place design against brittle fracture on an equal basis with design for ductile behaviour. This means that the design process must be sensitive to the material, the loading rate, the temperature, the design approach, the structural type and the details. Finally the design approach must be confirmed by large scale structural tests under realistic environmental conditions.

As part of this effort, C-FER will keep abreast of developments in material and weldment toughness and corrosion resistance. Load-deformation response characteristics must be developed, for both plate elements and stiffening ribs - under appropriate temperature and strain rates - and with various detail severities. Methods of analysis will be established, that are sensitive to factors that might encourage brittle failure. Since the program will attempt to develop a knowledge of the behaviour of actual structures and components, large scale testing is essential. C-FER will work to establish a testing facility that will accommodate tests of large structural components under realistic loading conditions.

SUMMARY

At this time C-FER is taking its initial steps - it's an exciting period. The research and networking programs are beginning to take shape; the staff is working enthusiastically; initial reports have been completed (see Appendix "C") and the Centre is "on track" and growing quickly. In the near future it is hoped that C-FER will take its place as a source of expertise of significance to the Canadian offshore community.

APPENDIX "A"

C-FER BOARD OF DIRECTORS

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APPENDIX "B"

C-FER - CENTRE FOR FRONTIER ENGINEERING RESEARCH

INITIAL RESEARCH PROGRAM

Steel Structures for the Arctic Environment

The projects included in the initial research program are:

(a) Materials and Welding

The requirements in this area are for C-FER to be aware of the steels available and proposed for Arctic use; their mechanical properties (including toughness) and corrosion susceptibilities. Similar requirements are necessary for the weldments - that is: C-FER must be aware of the effect of the choice of consumables and welding processes on the toughness and corrosion susceptibility of weldments.

This type of information is seen as the "raw data" required as input for the analysis of the structure and as the starting point for the development of member response characteristics.

It is not proposed that C-FER enter into research in these areas, except as indicated in the project entitled "Toughness and Corrosion Susceptibility". Rather C-FER will count on other research performers such as the Welding Institute of Canada and the University of Alberta to develop the information and will keep abreast of results through the Networking System.

(b) Development of Member Response Characteristics

A major project within this program is the development of member response characteristics for structural elements common to offshore structures. Initially these elements will consist of the welded plate, used as the structural element in ice resisting wall units and the stiffening frames used to transfer the loads from walls to the foundations.

The project entitled "Toughness and Corrosion Susceptibility" envisages the welding of plates of different toughness levels and corrosion resistances. The initial portion of this project will deal directly with the above problems. As a result of the specimen selection, however, each test sequence will make available several welded plate strips.

These strips will be used as bending test speciments to determine the response of the welded plate to transverse loads. The response will be determined at various temperatures and under differing strain rates. Both virgin and corroded specimens will be included.

A similar test program will be developed for other plate configurations and for stiffening frame elements. The object will be to model the actual element at a scale large enough to represent the real structure, then to empirically determine the load-deformation response under different temperature and strain rate conditions.

It is anticipated that details of varying degrees of severity can be catalogued in a manner similar to that presently used for fatigue design. This would dictate a testing program that starts with the stiffening frame element as-welded, but free from severe structural details, then progresses to similar elements containing structural details of increasing severity.

The result of this project would be a knowledge of how structural elements respond in low-temperature environments and a formulation of that response.

(c) Analysis

The member response characteristics both for plate elements and for the stiffening frames would be used as input information for the analysis of the complete structure. The member response characteristics would be sensitive to temperature, to strain rate, to material toughness and to severity of detail.

The goal of this project is to adapt or extend programs of analysis to provide for termination of the load-deformation response in an element when a brittle fracture occurs. This might be possible "fairly easily" by adjusting existing programs or it might require the development of a new approach.

In addition, since the brittle fracture problem appears to be sensitive to strain rate, the analysis would have to be dynamic and would have to model the anticipated dynamic characteristics of ice loading, for example. Thus existing test results must be accessed and extrapolated to structures having stiffnesses that differ from those used to obtain the research data.

(d) Seawater Corrosion

Clouding the entire issue of reliability of offshore structures is the question of corrosion. Overall corrosion will affect the section available to resist loads and selective corrosion will impact on the resistance of the structural element and as well affect its susceptibility to brittle failure.

It appears that knifeline corrosion may be a more significant problem in arctic waters, with the steels currently in use, than in warmer waters. As a first step, the corrosive environment (temperature, oxygen content, water chemistry, salinity) will be monitored at specific

sites; samples of various welded plates will be placed at the sites and monitored; reports of corrosion of vessels and structures used in the arctic will be monitored and collated; these results will then be used to select the type of speciments considered in later stages of the member response project.

(e) Large Scale Testing

In a program that attempts to simulate actual environmental effects and utilize realistic structural components, it is essential that tests be performed on structural models that are sufficiently large to enable the use of fabrication techniques typical of full scale structures. Thus, the appropriate residual stress levels and flaw distributions are built into the test specimens. It is also essential that these elements be tested under representative loading and temperature conditions.

C-FER must gain access to a testing facility that will provide these elements. We expect to expend considerable energy over the next two years in defining the design of the required cold chamber, anticipating the equipment required and designing suitable test specimens.

(f) Toughness and Corrosion Susceptibility

This project provides C-FER with a pilot study of several essential program components.

Basically, the project is an extension of a study in progress in Gulf's Pittsburgh research laboratory. The study will feature plate welded under low temperature conditions, possibly appropriate to a repair situation. The toughness of the plate and weldments and the corresponding corrosion susceptibilities will be detemined.

APPENDIX "C"

Report 84-01, "A Review of Design Guidelines for Steel Fixed Offshore Structures - A Canadian Perspective", by Karen A. Baker and D.J. Laurie Kennedy

Report 84-02, "A Review of Design Guidelines for Concrete Fixed Offshore Structures - A Canadian Perspective", by J.G. MacGregor, K.L. Baskin and R.M. Ellis.

USE OF ECONOMIC SIMULATION MODELS IN SOCIO-ECONOMIC ANALYSIS OF ENGINEERING PROJECTS IN THE NORTH*

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INTRODUCTION

Impact statements have become an important part of the process by which governments and their regulatory agencies assess the merits of proposed developments. These statements usually give the appearance of covering all aspects of potential impacts--everything from wild flowers to alcohol abuse. Yet in virtually all of the major impact statements filed in the past half-dozen years, the socio-economic component is only partially developed. Typically, the socio-economic component deals only with very specific issues and with direct effects to the exclusion of the overall or macro effects on the economy in question. In the case of the mega-projects under consideration in recent years, this is a major omission since some of these projects have the potential of completely transforming the local economies in which they are sited. The case in point in this paper is the development of the Beaufort Sea oil fields in the Mackenzie Delta and off the north coast of Northwest Territories.

The environmental impact statement Hydro Carbon Development in the Beaufort Sea - Mackenzie Delta Region was filed in 1982 by the major petroleum companies exploring in the area. Several potential pipelines and marine scenarios were discussed in this multi-volume statement. The most optimistic, referred to as "maximum feasible development" envisaged the eventual production of up to nearly 1.3 million barrels per day. Other scenarios ranged down to a smaller but still substantial production of approximately 75 thousand barrels per day.

The socio-economic component of this statement identified a number of specific requirements for labour, transportation and support from local businesses. It also discussed potential conflicts with native harvesting, effects on regional wage income, problems at the community level, etc. However, in no place did it pull together all of the potential economic influences to present a statement of the macro-economic effect of Beaufort Sea development on the economy of the Northwest Territories (NWT).

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* An earlier version of this paper was presented at the International Workshop on Population Issues in Arctic Societies, Gilleleje, Denmark, May 1984 (see de la Barre, K. (Ed.), 1985. Proceedings, International Workshop on Population Issues in Arctic Societies/Actes, Colloque International sur les Questions démographiques dans les sociétés nordiques, Committee on Northern Population Research/Comité de recherche sur les populations nordiques, Département de démographie, Université de Montréal, C.P. 6128, Succ. "A", Montréal, Québec, Canada H3C 3J7). This version is published with the permission of the Committee.

The Macro-Economic Impact of Beaufort Sea Oil Development

In this section of the paper an attempt is made to investigate the macro-economic effect on the economy of the NWT of the maximum feasible level of development utilizing a 42-inch pipeline as the means of transporting the oil to market. The data employed in preparing this simulation were those provided in the impact statement Hydro Carbon Development in the Beaufort Sea - Mackenzie Delta Region. These data were used as input to a model of the NWT economy originally developed by the author and M.R. Olfert for the government of the NWT.

It must be pointed out that the data from the impact statement were not always in the appropriate form or at the optimum level of aggregation or disaggregation for use with the NWT economic model. This required aggregation or disaggregation under assumptions which may or may not be valid. Thus the material presented in the following pages should be interpreted as indicative of the type of information this kind of extended analysis is capable of providing rather than a definitive statement of the macro-economic effects of this particular project.

The potential impact of the maximum feasible development is shown for selected macro-economic variables in the following diagrams. Several additional variables could be utilized but those chosen are some of the typical macro indicators of an economy's behaviour.

The method of presentation is by way of comparison with a "base-case" scenario. The base-case was developed by projecting major expenditure and employment patterns for the next several years in the absence of any Beaufort Sea petroleum development. To the base-case is added the data from the impact statement to produce the simulated macro-economic consequences of the maximum feasible Beaufort Sea development. The simulation includes both development and production phases which actually occur simultaneously after about 1990 given a hypothetical start of development last year, that is in 1984.

In figure 1, Gross Territorial Product (GTP) for the base-case is compared with GTP with maximum feasible development identified on the diagram as "EIS 42 Pipeline". These figures are stated in constant 1983 dollars. The magnitude of the petroleum development is indicated by the increase in GTP to approximately 2.75 times its base-case value by 1990 and its leveling off at about 1.75 times base-case value in 2000.

Employment is shown in figure 2. The total employment associated with maximum feasible development is broken into non-resident and resident employment subtotals. A substantial portion of the construction labour force would be of non-residents, many of whom would live in work camps constructed especially for them. Resident employment increases over the base-case through a reduction of the unemployment associated with the base-case projections, through an increase in the participation rate projected in the base-case case and through an increase in the resident labour force by people moving into the NWT from southern Canada to take up jobs in the expanded trade, service, transportation and government sectors. Peak (total) employment is simulated at approximately twice the base-case value in the early 1990s and at about 1.35 times in 2000.

Population increases with development, of course, and the projected increase for maximum feasible development is shown in figure 3 which refers to number of people present in the NWT whether resident or non-resident. Population is simulated at approximately 1.5 times base-case value in 1990. This is less than the increase in the anticipated labour force because most non-residents would not have families with them. One interesting aspect of a major development in the NWT, not shown on the diagram, is the change that is produced in the ratio of Native to non-Native population. Natives made up 58 percent of the NWT population at the time of the 1981 census but, with the development under consideration, this ratio is simulated to fall to 40 percent in 1990 and to be 47 percent in 2000.

The migration pattern which produces the population changes is shown in figure 4. Net migration peaks prior to the peak in GTP or employment because it shows the response to the change in economic activity rather than the level. Following the substantial in-migration of the late 1980s, migration turns negative in 1991 and remains negative for most years until the mini-peak in 1998.

One of the most dramatic of the comparisons is in per capita incomes as shown in figure 5. These figures are produced by dividing the income of both residents and non-residents by the number of people simulated to be present in the NWT, again both residents and non-residents. The exaggerated peaks occur because of the high wages paid to construction workers and because the ratio of workers to total population increases during construction periods with the increased use of non-resident labour.

Conclusions

The preceding discussion and diagrams illustrate the types of macro-economic impacts that a major development could have on a regional economy. Identification of these impacts raises a number of important questions regarding the provision of housing, schools, medical care, law enforcement, etc. that would be required because of the induced development occasioned by the development project but not typically considered in the conventional impact statements. This is a major omission. Consideration should be given to requiring such an expanded socio-economic analysis in future impact statements.

FIGURE 1

REAL GTP - NORTHWEST TERRITORIES

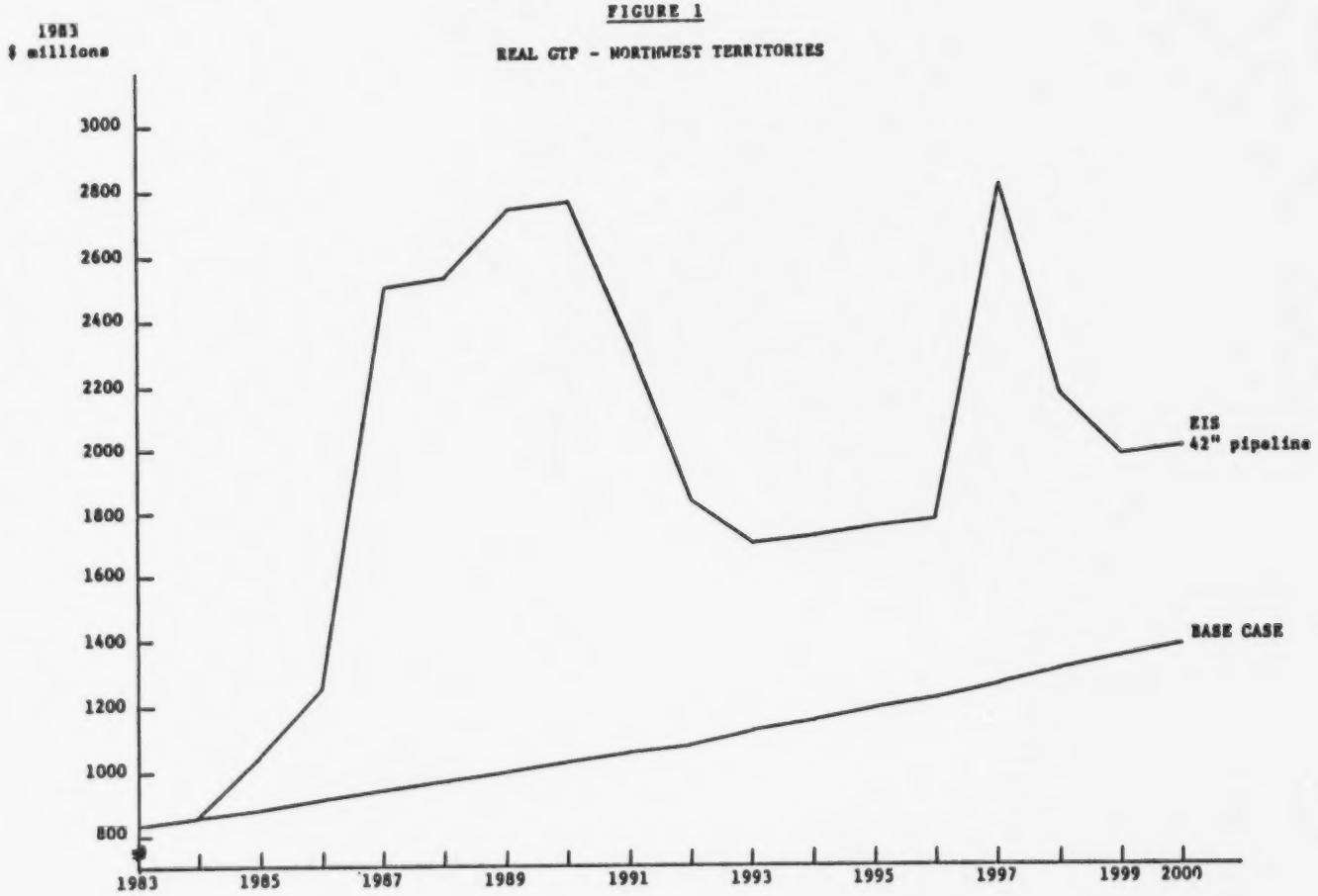


FIGURE 2

EMPLOYMENT - NORTHWEST TERRITORIES

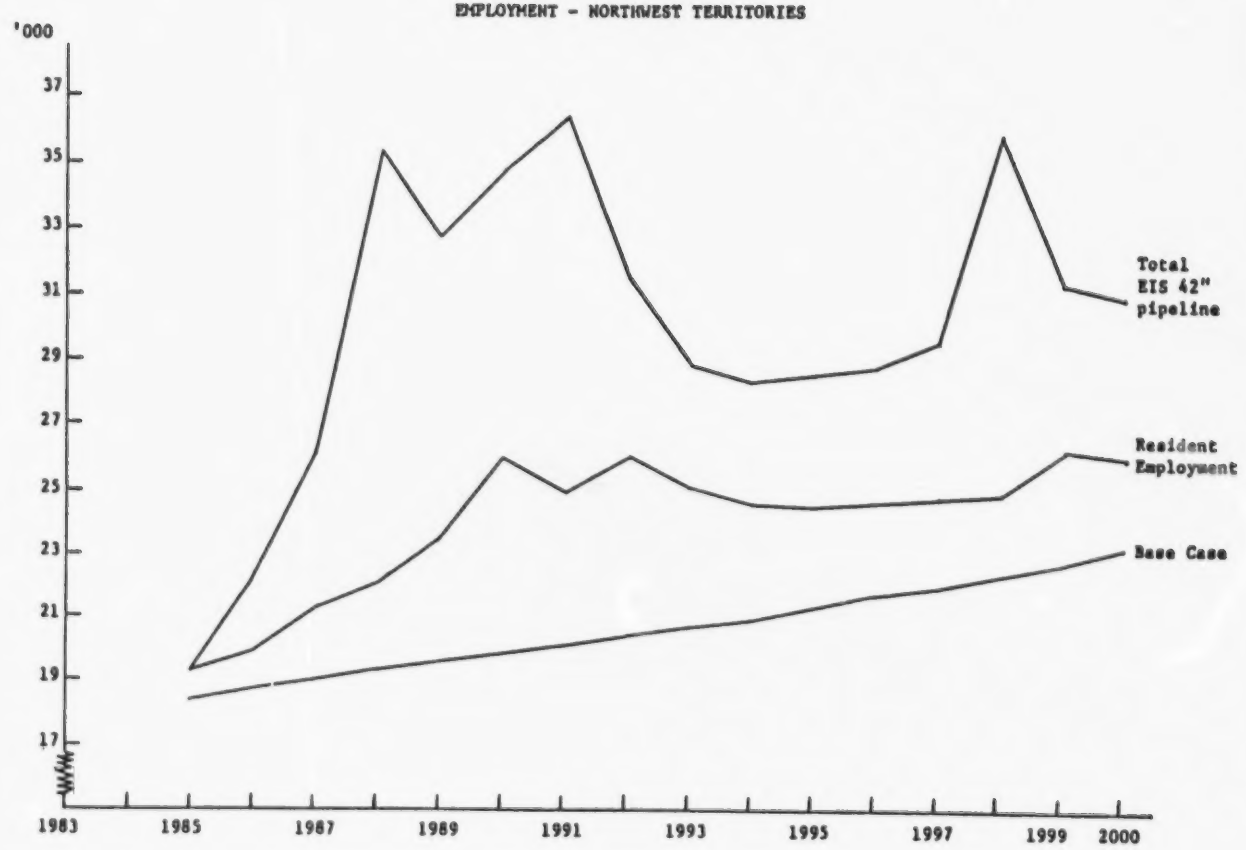


FIGURE 13

POPULATION - NORTHWEST TERRITORIES

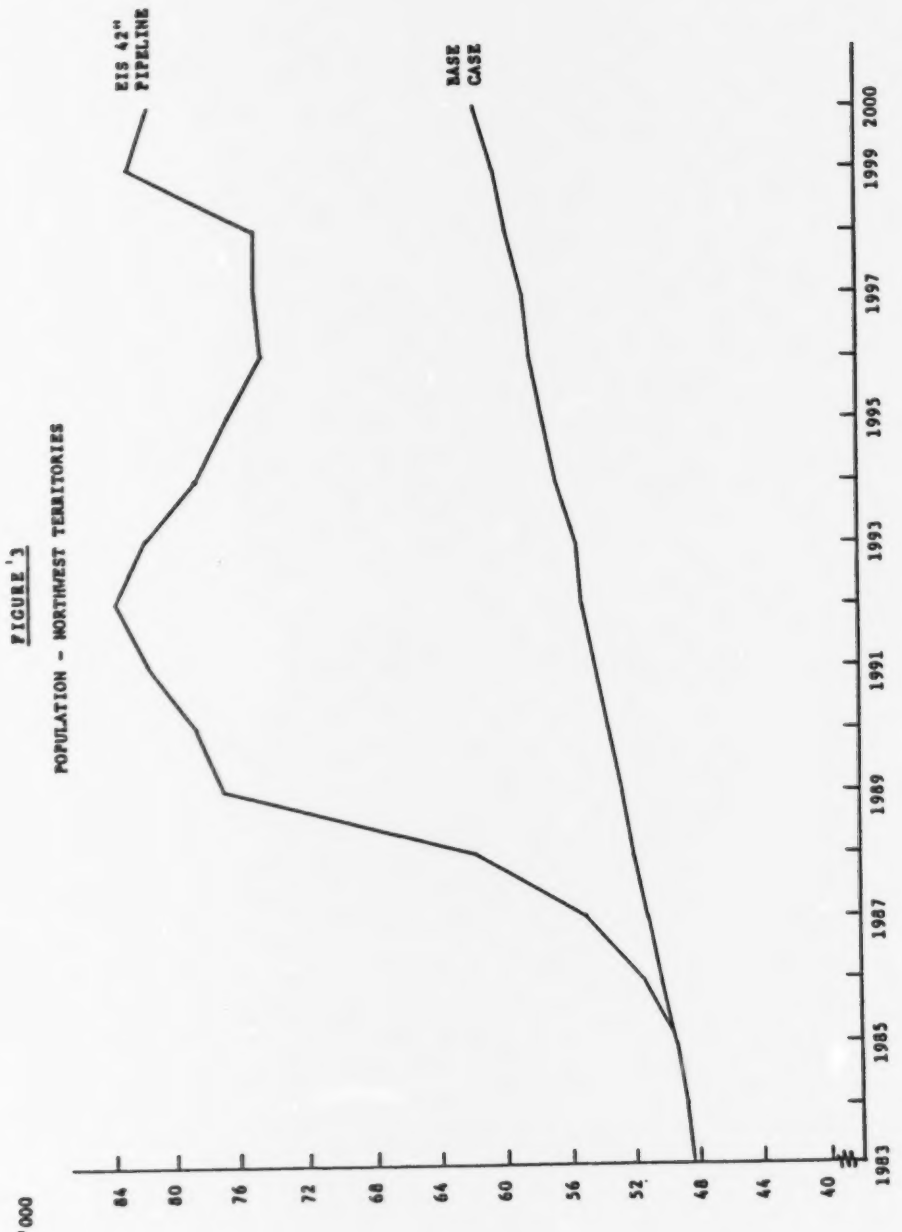


FIGURE 4

NET MIGRATION - NORTHWEST TERRITORIES

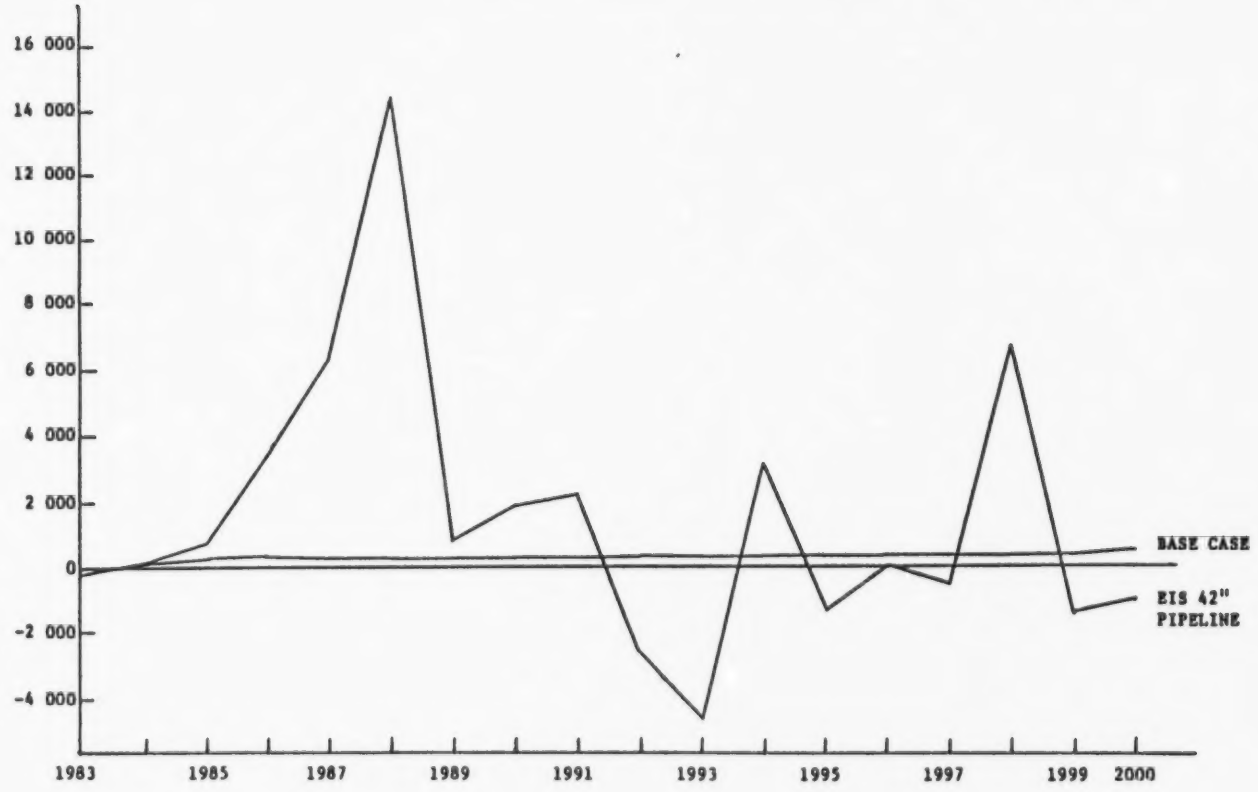
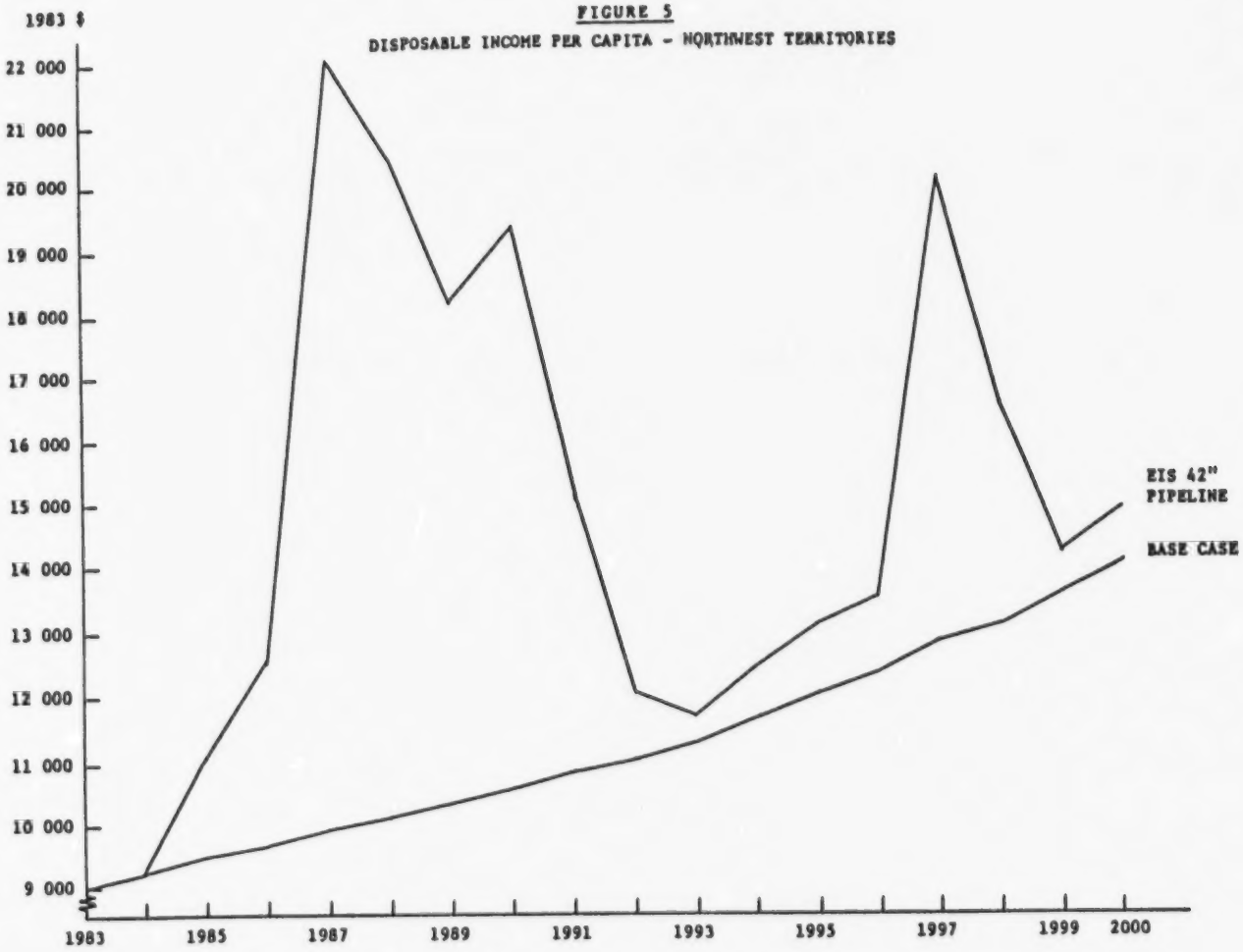


FIGURE 5

DISPOSABLE INCOME PER CAPITA - NORTHWEST TERRITORIES



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ADAPTING TO NORTHERN TECHNOLOGY - AN HISTORICAL PERSPECTIVE

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For more than 99% of man's evolutionary development he has been a hunter. We are what we are today because of our hunter ancestors. Our anatomy, physiology and psychology evolved when we were hunters. The human mind evolved in a world of human sparsity and small group life and it is under these conditions that the brain still functions best. Complex brains are adapted to biological richness and therefore require interesting surroundings. In contrast to hunter societies, agrarian and industrial societies homogenize their surroundings as well as greatly increasing the size of groups (Shepard 1973).

The popularly held belief that urban life is more complex than the hunter's world is based on the belief that urban life is composed of diverse classes of people with specialized occupations, whereas the hunter's world is egalitarian, that each individual is capable of only the limited range of available activities. But urban life is only more complex from the outside observer's position. It is not more complex from the standpoint of its individual members (Shepard 1973).

Many educated westerners think of their cave-man ancestors as instinctual animals bashing each other with clubs, greedily gnawing on bones, coupling promiscuously and unable to communicate beyond grunts. The recent, ridiculous film "In Quest of Fire" which portrayed primitive hunters as bumbling fools is an excellent example of this unenlightened view.

I wish to examine some of the characteristics of hunters in order to dispel the propaganda which has been disseminated by agrarian and industrial societies for the last 10,000 years as a means of justifying their genocide and ethnocide of hunters. For this presentation I will often draw from the Inuit with whom I am more familiar.

The technology of traditional hunters was beautifully adapted to their environment and to a nomadic way of life (Herbert 1976, Lewis 1976, Nelson 1969, Bliss et al, 1973). The Inuit Igloovera, or hunting igloo, of the central and eastern Canadian Arctic, for example, is a masterpiece of architectual design and simplicity. The only tool required to build an igloovera is a snow knife; the only building material needed is "upsik" or wind packed snow - of which there is an abundance in the arctic. This hemispherical structure can be erected in an hour by one or two Inuit. The operation looks like child's play, but not until the novice attempts to construct an igloovera does he or she appreciate the thought, ingenuity and skill which must have gone into the development of this structure over thousands of years (Riewe 1982). Modern man has never been able to develop an arctic shelter with such low energy requirements for construction and heating, and such habitable space.

The skillfully constructed, tailored, skin clothing of the Inuit is another major achievement in arctic adaptation which helped them maintain themselves over the thousands of years of their northern sojourn (Riewe 1975). A person dressed in traditional caribou clothing carries about 4 kg fully dressed from head to foot; a third the weight necessary for comfort at low temperatures using southern-style winter clothing (Stefansson 1955). Inuit skin clothing is equivalent to modern man's heated microenvironments - his home, auto, work place, etc. - but is far more portable, comfortable and energy efficient.

Let us briefly examine the early hunter's tool kit, which is often believed by urbanites to be extremely crude compared to that of later agrarian tool kits. Archeologists have discovered that a hunter's tool kit, 100,000 year old, contained up to 73 different stone tools, and that 25,000 years ago the kits had increased to as many as 240 stone tools (Shepard 1973). This does not include tools made of perishable materials such as bone, ivory, wood, feathers or hide. If the number of inventions is tallied in terms of the number of man-years lived, the rate of technological change may have changed over the last 300,000 years. The significance of this is that if a tool change is made once in every 10,000,000 man-years it would constitute a rate of change of only one tool each 20 years in a population of 500,000 hunters, but 350 changes in a year in our present world population. An important point to note is not only that the rate of invention may be fixed by our biology but also the danger that our ability to cope with change may also be biologically fixed (Shepard 1973).

We could continue to discuss appropriate hunter technology, however, technology was always far less important to the survival of these peoples than was their intimate knowledge of their environment and their highly refined social skills. From a nomadic hunter's perspective it was far more effective to instruct children in animal behaviour to minimize the distance between hunter and prey, than to invest in equipment improvements (Laughlin 1976). As is readily seen today, an increased reliance on technology always reduces the skill required of an individual to secure game (Leopold 1949), this holds true in most facets of life.

Subsistence hunting is far more complex than currently admitted by western man. Hunting behaviour can be broken into five complexes (Laughlin 1976):

1. programming the child to be a self reliant hunter;
2. scanning or collecting information;
3. stalking and pursuit of game;
4. immobilization of game;
5. the retrieval of game.

Shortage of time requires that I must restrict my comments to the first part of this hunting complex, that of child programming and training. Hunters often train their children with specific games which employ hunting skills. The Aleut, for example, had specific games for their young children which lengthened and strengthened the tendons in the shoulder joints of their throwing arms, their lower backs, and posterior knee joints. These exercise games prepared the boys for the considerable strain which would be placed on their anatomy when hunting from kayaks later in life (Laughlin 1976).

Hunters are taught from infancy to be acute observers of their environment and to listen attentively and to learn from their elders. The stories of senior hunters are filled with ecological richness (Freeman 1978) which makes our university courses appear shallow and naive by comparison. The hunting environment is a particularly rich educational milieu in that children are not only taught a diversity of subjects such as animal behaviour, anatomy, botany, climatology, ecology, nutrition, religion, physics, etc., but also the virtues of patience, self-control and cooperation (Wenzel 1984). The excellent teacher:student ratio on a hunt, with several men to a couple of boys, provides the youths with several confident role models to emulate.

As a means of creating confident adults many hunters do not chastise their children. The Inuit's reason for not chastising their children stems from their view of human life. Traditional Inuit believe that a human consists of four complex parts - the body, breath, spirit and name (Correll 1976, Herbert 1976). The spirit or soul is said to be attracted to an individual's name at birth. The process of naming is actually the discovery, by divination, of what spirit has entered the child at birth. The name-spirt links the child to the past, to his or her ancestors. The name comes to the infant from some dead or living ancestor who also possesses the name. Along with the name comes all the attributes that the child inherits. These include personality and character traits, aptitudes for certain skills, etc. Since the individual's personality and aptitudes are derived from his or her namesakes, the child is fated to make its own way in life. The namesake, therefore, encourages the development of a self-reliant individual, for the children are treated with respect and integrity due to their ancestral namesakes (Guemple 1976).

As another means of creating confident adults traditional Inuit restricted their use of praise to very young children. When a small child makes his first kill of a lemming or sandpiper he might be praised by saying that "Many caribou will fall to his bow". But once he kills a significant animal, such as a seal or caribou, he would never again be praised because he was then an adult and was expected to be an excellent hunter. The Inuit realized that only the extremely competent persons could survive in their harsh environment, and therefore all adults were competent and did not require praise (pers. com. Minnie Freeman 1973).

In contrast, all of us now living in this modern western society are plagued with personal insecurities. We all lack the skills required to be completely self-sufficient. We are all divorced from the land that nurtures us and are at the mercy of thousands of faceless individuals for our basic daily needs. In order for our sagging infantile egos to survive we are constantly demanding some form of praise.

Hunters developed cooperative systems of sharing which are often referred to as generalized reciprocity. Every member in such a kinship group has specific obligations and responsibilities to every other member. Gratitude is never extended nor expected during these sharing interactions. In contrast, we Euro-North Americans use a system of direct or balanced reciprocity between individuals which is usually mediated through hard cash. We sometimes employ generalized reciprocity among a restricted group of intimate friends, blood

relatives and in-laws, but even these limited obligations often break down, particularly through divorce. Unlike our confined kinship groups, which are usually the nuclear family or even only the single parent family, hunters recognize very complex kinship systems (Service 1966).

Adoption has been an important means of extending kinship among the Inuit. As many as 40% of the Inuit in traditional communities were adopted at one time or another (Guemple 1976). Often adoption solves the problems of a family without a son or daughter. However, families may give up one child and adopt another. These adoptions are often not between blood kin. If one family adopts a child from a non-kin group, the two groups become members of each others kinship group.

The system of namesakes also extends the kinship group in that persons with the same name are considered kin. In some areas child betrothals were arranged sometimes even before the promised husband or wife was born (Guemple 1976). The promise of betrothal between non-related families served as a basis for alliance between these families. The alliances often continued even if the marriage was never consummated. There were also special social bondings between midwives and neonates.

Diverse forms of partnerships have existed among the Inuit from Siberia to Greenland including joking, dancing, boxing, trading, song dueling, name avoidance, seal sharing, mock antagonism and similar age partnerships. All of these partnerships extended the kinship groups and hence increased cooperation. The end result of this extended kinship group was that everyone in a band or often in distant bands was related. Strangers could be easily incorporated into the social structure through any of various conventions and hence become an integral part of the generalized reciprocity (Guemple 1976; Van de Velde 1976).

It is high time that we eliminate the bad press our agrarian forefathers heaped upon our hunter ancestors and to appreciate our valuable heritage. There is much that we can still learn from the traditional hunters which is applicable to our own life styles in Canada today. Our society has astronomical energy demands - the average North American consumes as much as 140 Nepalese. This energy is devoured in all sectors of our lives: industry, defence, transportation, housing, recreation and food production, among others. For example, our North American agricultural system with its ever increasing dependency upon technology requires a spiraling energy subsidy. Feed lot operations again, for example, require about 20 to 50 calories of subsidy for every calorie produced. In order to feed the entire world with a North American type of food system, almost 80% of the world's annual energy expenditure would be required just to drive the food system (Steinhart and Steinhart 1974).

In contrast, traditional hunter societies were extremely energy efficient, for every calorie expended they produced about 10 calories (Steinhart and Steinhart 1974). Not only is our system of food production extremely wasteful in terms of energy but it also degrades the life-sustaining soils upon which our society so critically depends.

We can also learn much from the traditional Inuit about appropriate dress; Euro-Canadians could live much more comfortably in the winter if they did so.

Our dwellings demand incredible energy to build and maintain. Perhaps we could learn how to lower our expectations and how to use energy efficient architecture. Or more importantly, we could reduce our energy demands by learning to live communally. Our modern apartment buildings are the most isolating, lonely dwellings ever known to man. If we could learn social skills such as communal sharing, unobtrusiveness and never speaking out in anger (Briggs 1970) from the traditional hunters, perhaps we could break our trend of the single-parent family and begin to develop cooperative, more satisfying human relationships. We could also attempt to learn how to reduce our energy demands required for our recreational pursuits.

We can also learn much from traditional hunters about child rearing and education. We should be protecting rich biological environments so that our children may grow to be healthy, alert, confident adults. We must consider the long term effects of massive development schemes upon our society before we destroy all vestiges of healthy human environments. When planning northern developments we should be seeking the advice and direction of the peoples traditionally using the land (Freeman 1978).

In conclusion I wish to stress that a more rewarding future for mankind does not reside in technology but rather with the redevelopment of healthy social relations. In a session such as this, devoted to Northern Engineering, it is important to remember that our modern western society can still learn much from the remaining traditional hunters. If we dismiss our millions of years of evolution as hunters, we may in fact dismiss all of mankind.

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REPORT OF THE 1985 ANNUAL CONFERENCE

REPORT OF THE PRESIDENT

TO THE

ANNUAL GENERAL MEETING

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RAPPORT DU PRÉSIDENT

À

L'ASSEMBLÉE GÉNÉRALE ANNUELLE

APRIL 27, 1985 - 27 AVRIL 1985

PRESIDENT'S REPORT TO THE ANNUAL GENERAL MEETING

APRIL 27, 1985

1984-85 has been an unusually stimulating year for the Association. Before highlighting some of the developments, I would like to set them in the general context by restating the Issues and Related Activities framework which was used as a major basis for reporting in 1983-84. I do this because I think it is important to indicate that we are being consistently guided by certain underlying issues, questions or objectives, and that we are trying to address these as effectively as we can over the longer term.

ISSUES FOR ACUNS

1. How to maintain a high level of university interest in northern research and advanced manpower training in times of economic constraint.

   Related activities: Canadian Northern Studies Trust which provides funding for students and northern residents in northern studies at Canadian universities; representations to the Social Sciences and Humanities Research Council; visits to universities, for example in 1984-85 to the University of Calgary, McGill University, Concordia, and others; publication of the newsletter Northline.

2. How to apply or implement northern research more effectively.

   Related activities: Northern Health conference chaired by Dr. Stuart Smith at the 1984 Annual General Meeting; visits to government, educational and corporate offices in Yellowknife, Whitehorse, Alaska, and Calgary; organization of the Arctic Heritage Symposium; development of visits to Scandinavia; work on scientific exchanges with the U.S.S.R.; continued dissemination of the List of Northern Specialists, 1983, Proceedings of the Boreal Forest Symposium, and other publications; organization of a session on Northern Engineering: Organization and Policy for the Annual General Meeting, Edmonton, 1985; the Canadian Northern Studies Trust.

3. How to assist native people and northern residents in becoming better prepared to undertake research, advanced manpower training, and the development of effective information systems.

   Related activities: Dissemination of ACUNS handbook on Ethical Principles for the Conduct of Research in the North; a survey by the Committee on Relations with Northern Peoples of the use of this handbook in northern communities; continued work by the Education Committee on distance education with exploration of a possible course of this type; major effort to develop a workshop on the role of universities in advanced education and research in the North; extensive contacts have been made in this regard and a preliminary

meeting organized in Yellowknife, April 22, 1985, with NWT officials; continued work on Special Awards for northern residents through the Canadian Northern Studies Trust, notably the development of a native studentship program under the auspices of CNST in collaboration with the Native Economic Development Program.

4. How to become more effective in learning from and coordinating circumpolar research and advanced education internationally, that is in the circumpolar region.

   Related activities: the Arctic Heritage Symposium, Banff, 24-28 August, 1985; visits to Scandinavia; visits by Soviet scientists; possible ACUNS team visit to U.S.S.R.

5. How to develop better means for assisting with an array of short term interests and problems raised by our clientele, whether university, northern resident, government or corporate.

   Related activities: Organization of a lecture visit by Commisioner Bell, Yukon, to the University of Ottawa and possible Yukon and Northwest Territories lectureships of this type; enquiries on the Environmental Studies Revolving Fund, the Canadian Wildlife Service and other environmental budget reductions; representations on the Northern Scientific Training Program, the Northern Conservation Task Force Report; co-sponsorship of Operation Raleigh; participation in the ICC Arctic Policy Conference, Montreal, September 1985; publication of the Licences and Permits handbook and other documents; representatives serving on the National Committee of the International Permafrost Association, the Churchill Northern Studies Centre, the Northern Scientific Training Program Committee, and other bodies.

MAJOR ACTIVITIES IN 1984-85

1. Canadian Northern Studies Trust

The Chairman of the Trust will report more fully on this program. The basic point to be made here is that it has been a major challenge to raise funds for the Trust in this time of economic constraint. We have however been more successful than in any previous year, in large part as a result of the development of a new native studentship program with the Native Economic Development Program. However, the future of the Trust remains to be determined as we are entering the last year of the four-year matching grant from the Donner Canadian Foundation. It will require the interest and cooperation of all our members and a substantial contribution from some who will be asked to assist the Management Committee and hold office in this work in 1985-86.

2. Arctic Heritage Symposium

In regard to the program and the participation of interested scientists and professionals from the various arctic countries, the situation is excellent. We now have a complete program and roster of speakers and participants. Some changes have been made in the original proposal, in large part because of representations or requests to participate from overseas.

Examples include a report on the Regional Seas Program, United Nations Environmental Program; the World Heritage Trust; and arctic transport and its relation to research and environmental management and heritage in the Arctic. We have received numerous expressions of support for this international symposium.

Raising funds for the symposium has been difficult. A large amount of support is however available through small-scale commitments by individuals or organizations. We are still working on securing funds to assist with travel and accommodation of participants from Canada and overseas. There is considerable interest and support for the publication of the proceedings, for example from the Commission on Ecology of the International Union for Conservation of Nature and Natural Resources.

3. The Role of Universities in Advanced Education and Research in the North

In organizing this project, ACUNS is attempting to reach out to northern residents and secure their views on the advantages and disadvantages of the role of southern universities in the North in the past. We are of course also very much seeking northern views on the way that we can assist with the development of higher educational and research functions in the Canadian North in future. In carrying this initiative forward, we hope to hold a workshop in collaboration with northerners but will be guided by their suggestions as to useful means of collaboration, as such suggestions are forthcoming at a meeting in Yellowknife, April 22, 1985. We are of course also very much interested in drawing on the experience of other northern countries in the advanced education and research fields. Alaska, the Scandinavian countries, and the U.S.S.R. all have made far more progress in the development of northern higher educational institutions than has Canada.

4. ACUNS Committees

The following committees have been at work in 1984-85 and separate reports will be heard from their chairmen.

Canadian Northern Studies Trust - J.K. Stager, Chairman
Education Committee - J.B. Carefoot, Chairman
Research and Field Facilities Committee - F. Cooke, Chairman
Committee on Relations with Northern Peoples - H.A. Williamson, Chairman
Nominating Committee - J.B. Carefoot, Chairman

5. A considerable amount of time has been spent in finding a new Executive Director for the Association, as well as a new Vice-President. We are extremely fortunate in having been able to persuade Dr. Peter Adams to take up the position of Executive Director for a two-year term beginning July 1, 1985. Peter has been working with us on a part-time basis since February and has already made a substantial impact in terms of ideas and energy. We are also very pleased that Professor Marc-Adélard Tremblay of Université Laval agreed to serve as Vice-President, beginning in October 1984. His counsel has already been very useful to his colleagues on the Board and to myself and the members of the staff. We are also all in debt to Louis-Edmond Hamelin who served as Vice-President of the Association for fifteen months until his retirement from Université du Québec à Trois-Rivières.

Finally, I would like to express my heartfelt thanks to Eileen van Heyst. Because of the unusual circumstances in the office this year, I have had the opportunity to work with her more closely than in the past and very much appreciate the support she gives generally and the way in which she conducts the myriad of tasks that are not mentioned in a report like this. Examples include the revision of the Council Members' Handbook, the conduct of an increasing array of correspondence, and servicing the Canadian Northern Studies Trust and other major committees.

I am also grateful to the Chairmen of the Committees, the members of the Board and others who have assisted to a somewhat unusual degree in the work of the Association this year. In this regard, I would like to make special mention of Jim Carefoot of the Nominating Committee. I would also like to recognize and thank Dr. Roger Needham, University of Ottawa, who has literally spent hundreds of hours on the organizational details connected with the Arctic Heritage Symposium.

J. Gordon Nelson
President

March 11, 1985

RAPPORT DU PRÉSIDENT À L'ASSEMBLÉE GÉNÉRALE ANNUELLE

DU 27 AVRIL 1985

L'année 1984-1985 s'est avérée particulièrement enrichissante pour l'Association. Avant de souligner les principaux progrès accomplis, j'aimerais les insérer dans un contexte plus large en reprenant la formule adoptée en 1983-1984 pour rendre compte des grandes questions d'intérêt et des activités auxquelles se consacre l'Association. J'entend de cette façon souligner que l'action menée par l'Association est guidée par des questions, problèmes et objectifs et dépend d'un travail constant à long terme.

GRANDES QUESTIONS D'INTÉRÊT

1. Comment faire pour maintenir à un niveau élevé l'intérêt des universités à l'égard de la recherche nordique et de la formation supérieure pertinente, en un temps de restrictions économiques?

   Activities connexes: La Fiduciaire canadienne d'études nordiques, qui permet aux étudiants et aux gens du Nord de suivre un programme en études nordiques dans les universités canadiennes; représentation de l'AUCEN auprès du Conseil de recherches en sciences humaines; tournée dans les universités canadiennes en 1984-1985, notamment à l'Université de Calgary, l'Université McGill, l'Université Concordia et autres; publication du bulletin Point Nord.

2. Comment mettre en oeuvre plus efficacement les programmes de recherches nordiques?

   Activités connexes: Conférence sur la santé dans le Nord canadien sous la présidence du Dr Stuart Smith dans le cadre de l'assemblée générale annuelle de 1984; tournée auprès d'établissements du gouvernement, de l'entreprise privée, de maisons d'enseignement à Yellowknife, à Whitehorse, en Alaska et à Calgary; tenue du symposium sur le patrimoine de l'Arctique; préparation d'une tournée en Scandinavie; arrangements en vue d'échanges scientifiques avec l'U.R.S.S.; diffusion continue de la Liste des spécialistes du Nord, 1983, du compte rendu du symposium sur les forêts boréales, et autres publications; préparation d'une rencontre ayant pour thème les travaux d'ingénierie dans le Nord canadien: organisation et politique à suivre, pour l'assemblée générale annuelle à Edmonton; la Fiduciaire canadienne d'études nordiques.

3. Comment aider les Autochtones et les Nord-Canadiens à mieux se préparer aux activités de recherche, à acquérir une formation supérieure, et à mettre sur pied des réseaux efficaces d'information?

Activités connexes: Diffusion du code déontologique de l'AUCEN, Principes d'éthique pour la conduite de la recherche dans le Nord; enquête du Comité des relations avec les résidents du Nord quant à l'utilisation du code par les communautés nordiques; poursuite des travaux du Comité de l'éducation ayant trait à l'éducation à distance et aux possibilités d'offrir un programme de cet ordre; effort sérieux en vue d'organiser un atelier portant sur le rôle joué par les universités dans le domaine de l'enseignement supérieur et de la recherche dans le Nord canadien; plusieurs contacts ont été faits en ce sens et une rencontre préliminaire aura lieu avec des représentants des T.N.-O., le 22 avril 1985; préparation d'un programme de bourses spéciales s'adressant aux résidents du Nord par l'entremise de la Fiduciaire, notamment la préparation d'une programme de bourses d'études à l'intention des Autochtones offert conjointement par la Fiduciaire et le Programme de développement économique des Autochtones.

4. Comment coordonner plus efficacement la recherche circumpolaire et la formation supérieure pertinente à l'échelle internationale, et en tirer judicieusement profit dans la zone circumpolaire?

   Activités connexes: Tenue du Symposium sur le patrimoine de l'Arctique à Banff, du 24 au 28 août 1985; tournée en Scandinavie; tournée de scientifiques soviétiques au pays; visite probable d'un groupe de l'AUCEN en U.R.S.S.

5. Comment mettre au point de meilleurs mécanismes d'aide à la résolution des questions et des problèmes à court terme soumis par notre auditoire des secteurs universitaires et public, les entreprises et les Nord-Canadiens?

   Activités connexes: Préparation d'une visite conférence du Commissaire Bell, du Yukon, à l'Université d'Ottawa et tenue possible de conférences identiques par des représentants du Yukon et des T.N-O; enquête sur les réductions budgétaires affectant les Fonds renouvelables pour l'étude de l'environnement, la Service canadien de la Faune, et sur les réductions ayant rapport à l'environnement; participation de l'AUCEN au Programme de formation scientifique dans le Nord, au rapport du Groupe d'étude sur la conservation du Nord; co-parrainage de l'Opération Raleigh; participation à la conférence de l'ICC sur les politiques visant l'Arctique qui se tiendra à Montréal en septembre 1985; publication du Répertoire des licences et permis ainsi que d'autres documents; représentation de l'AUCEN auprès du Comité national de l'International Permafrost Association, du Centre d'études nordiques de Churchill, du Comité du Programme de formation scientifique dans le Nord, et d'autres organismes.

PRINCIPALES ACTIVITÉS DE L'AUCEN EN 1984-1985

1. Fiduciaire canadienne d'études nordiques

Le Président de la Fiduciaire se chargera de présenter un compte rendu détaillé des activités de la Fiduciaire. Néanmoins, j'aimerais indiquer que l'obtention de fonds pour la Fiduciaire s'est avérée un véritable défi étant donné la situation économique actuelle. Malgré cela nous avons connu cette année un plus grand succès que par le passé en raison de la création d'un nouveau programme de bourses d'études à l'intention des Autochtones rendu possible grâce à la Fiduciaire et au Programme de développement économique des Autochtones. L'avenir de la Fiduciaire n'est pas pour autant assuré car nous en sommes à la quatrième et dernière année du plan de co-financement de la Fondation canadienne Donner. Son avenir dépend donc de l'intérêt et de l'appui manifestée par l'ensemble des membres et de la contribution importante de ceux qui seront appelés à prêter main forte au Comité de gestion et à y assumer des fonctions au cours de l'année 1985-1986.

2. Symposium sur le patrimoine de l'Arctique

À en juger par le programme lui-même et l'intérêt qu'il suscite chez les scientifiques et professionnels concernés dans les divers pays donnant sur l'Arctique, on ne pourrait s'attendre à mieux. Le contenu du programme est arrêté et la liste des conférenciers et participants est maintenant complète. Nous avons dû apporter certaines modifications au projet initial car nous avons été débordés par les offres et les demandes de participation provenant de l'étranger. On nous a offert entre autres des présentations au sujet du Programme des mers régionales du Programme des Nations Unies pour l'environnement; une autre sur le Fonds du patrimoine mondial; et une autre encore sur le transport dans l'Arctique et son incidence sur la recherche, la gestion de l'environnement et le patrimoine de l'Arctique. Nous avons reçu de part et d'autre de nombreux encouragements pour l'organisation de ce symposium d'envergure internationale.

Il nous a été difficile d'obtenir un appui financier et jusqu'ici la plupart des fonds en vue de la tenue du symposium nous proviennent de dons modestes faits par des individus et organismes. Nous cherchons à obtenir de l'aide afin d'alléger les frais de voyage et d'hébergement encourrus par les participants canadiens et étrangers. Plusieurs milieux nous encouragent aussi à publier un compte rendu du symposium et se montrent intéressés, notamment la Commission de l'écologie de l'Union internationale pour la conservation de la nature et de ses ressources.

3. Le rôle des universités en ce qui a trait à l'enseignement supérieur et à la recherche dans le Nord canadien

Par l'amorce de ce projet, l'AUCEN espère rejoindre les résidents du Nord afin de connaître leurs vues sur les avantages et inconvénients que comportait, par le passé, l'apport des universités du pays dans le Nord canadien. Nous sommes aussi intéressés à connaître l'avis des gens du Nord quant à la contribution que nous pourrions apporter à l'avenir pour

l'avancement de l'enseignement supérieur et de la recherche dans le Nord. Une fois cette démarche accomplie, nous envisageons la préparation d'un atelier avec la collaboration des gens du Nord en nous inspirant de leurs suggestions quant aux modes de collaboration souhaitables et des propositions formulées au cours de la rencontre du 22 avril 1985 à Yellowknife. Nous comptons tirer profit de l'expérience acquise par d'autres pays nordiques dans les domaines de l'enseignement supérieur et de la recherche. L'Alaska, les pays scandinaves et l'U.R.S.S. devancent de beaucoup le Canada en ce qui a trait à l'établissement d'instituts d'enseignement supérieur dans les régions nordiques.

4. Comités de l'AUCEN

Les comités suivants ont été fort occupés en 1984-1985 et les présidents rendront compte un à un des travaux accomplis par leur comité respectif.

Fiduciaire canadienne d'études nordiques - J.K. Stager, Président
Comité de l'éducation - J.B. Carefoot, Président
Comité de la recherche et des stations de terrain - F. Cooke, Président
Comité des relations avec les résidents du Nord - H.A. Williamson, Président

Comité des nominations - J.B. Carefoot, Président

5. Il nous a fallu un temps considérable avant de trouver un nouveau Directeur général et un nouveau Vice-président pour l'Association. Nous avons eu la chance de pouvoir convaincre M. Peter Adams d'accepter le poste de Directeur général à compter du 1er juillet 1985. Depuis le mois de février, Peter travaille à mi-temps à l'Association et il est déjà reconnu pour les idées et le dynamisme dont il sait faire preuve. Nous sommes aussi très heureux que Marc-Adélard Tremblay, professeur à l'Université Laval, assume les fonctions de Vice-président de l'Association depuis le mois d'octobre 1984. Ses collègues du Conseil d'administration, l'ensemble du personnel et moi-même apprécions ses conseils utiles et sa grand expérience. Nous sommes endettés auprès de M. Louis-Edmond Hamelin qui a assumé la charge de Vice-président de l'Association pendant quinze mois avant de prendre sa retraite de l'Université du Québec à Trois-Rivières.

En dernier lieu j'aimerais profiter de cette occasion pour exprimer mes sincères remerciements à Eileen van Heyst. En raison de circonstances particulières qui ont prévalu au bureau, j'ai eu la chance de travailler en collaboration étroite avec Eileen et de pouvoir apprécier l'appui considérable qu'elle sait fournir et les tâches multiples dont elle s'acquitte, chose que l'on passe généralement sous silence dans une assemblée. Au nombre de ces tâches, j'aimerais mentionner la révision de l'Ouvrage de ressource pour les membres du Conseil, la mise à jour d'une correspondance volumineuse et variée, et les services rendus à la Fiduciaire canadienne d'études nordiques et aux autres comités principaux.

Je suis aussi endetté auprès des présidents des comités, des membres du Conseil d'administration et des personnes qui m'ont apporté une aide énorme dans mon travail à l'Association cette année. J'aimerais remercier particulièrement Jim Carefoot du Comité des mises en candidature. J'aimerais aussi souligner le nom de Roger Needham, de l'Université d'Ottawa, qui a consacré des centaines d'heures à l'organisation minutieuse du Symposium sur le patrimoine de l'Arctique.

J. Gordon Nelson
Président

le 11 mars 1985

UNIVERSITY OF ALBERTA PRESENTATIONS

The meetings were hosted by the University in the person of Professor J.G. Kaplan, Vice-President, Research.

Sessions were organized by the University's Boreal Institute (Acting Director, Dr. A.S.A. Mohsen) which is a major institution in Northern Studies in Canada. The Institute has a substantial library, a considerable northern information system and it is the base for a variety of well established northern scholars and projects.

One morning was devoted to presentations on selected University of Alberta northern research programs. Professor C.G. Hickey, of the Department of Anthropology, introduced the session with an overview of Boreal Institute activities. He was followed by Professor Michael Asch, also of the Department of Anthropology, speaking on the land use mapping project which his group had undertaken with the Dene. There followed, in turn, Professor W.C. Mackay (Department of Zoology), C. Urion (Director, Native Student Affairs) and M.M.R. Freeman (Henry Marshall Tory Professor) talking, respectively, on projects in applied biology, the programs of the School of Native Studies, and International Northern Linkages. Professor Freeman, as Chairman of the MAB Northern Science Network, cited links with a variety of countries but stressed activities involving northern studies scholars from Japan.

Poster Presentations

In addition to the presentation on the Arctic Research Establishment, Pond Inlet, by Ely Panipakoocho, which is dealt with elsewhere in this volume, there were two major displays. One, by Professor Frank Duerden of Ryerson Polytechnical Institute, focussed on Ryerson's Yukon Mapping Project. The other, by Professor James T. Gray of Université de Montréal, focussed on geographical research in northern Quebec.

ARCTIC RESEARCH ESTABLISHMENT, POND INLET, N.W.T.

A Progress Report on the Arctic Research Establishment's Activities, Its Programs, Projects, and Main Experiments As of March 1985 and Covering the Previous 12 Years*

by
H.A.R. Steltner

The thematic details for the framework of the Total Systems Approach were developed between 1969 and 1971 for the theme "Arctic Marine Transportation".

This approach was tested in 1972 (EOS Project) and carried over into the set up (1973) of the Arctic Research Establishment (A.R.E.) in Pond Inlet.

For the long-term framework, the first period was estimated to require between 12 and 15 years before a thematic review would be needed.

Since we are now in the 12th year of our task, we feel that the review process should start with this report, listing all the programs, projects, and experiments carried out during this period.

The framework from which we have drawn our operational plans and programs has not yet reached a point of know-how saturation but it has clearly identified the specific subjects that are least known but recognized as elementary.

The operational plans, programs, projects, and experiments have all been executed using the "scientific" method, viz. HYPOTHESIS - ANALYSIS - SYNTHESIS - REVIEW REQUIREMENTS - EXPERIMENTS - ANALYSIS - SYNTHESIS AND COMPOSITION.

The technical crew, field and laboratory, are all locally and professionally trained people from the community. Their motivation assured a reliable and unprejudiced approach to their work.

The framework further illustrates that the arctic environment is fully alive and dynamic equally during the twelve months of the year, and our response to this fact is year-round activities. All our efforts, work, methods, systems, procedures, measurements, analysis observations, and presentations are either standard, or based on standards, and are transferable and repeatable by professionally trained technicians.

In 1978 we introduced computers to Pond Inlet, and all our data are now on tapes and discs. The prime repository of information on our efforts is the library of the Polar Continental Shelf Project (E.M.R.) in Ottawa.

Although basically engineering-oriented in our approach, it has been

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* The A.R.E. is a training and research establishment at Pond Inlet. Ely Panipakoocho, Operations Manager of the Establishment, gave a presentation on this topic at the Edmonton meetings. His talk was based on an exhibit of A.R.E. activities which was on view for two days. The posters referred to in this article formed the exhibit. Mr. Panipakoocho is a member of the Board of the Science Institute of the N.W.T.

recognized that our efforts are science-related and this recognition presents what we consider part of the fundamental truth and the inherent mandate of providing -

Solutions to some present problems and preparations for future tasks

Our continuous presence in the Arctic and determination to succeed in understanding and describing the natural processes around us in a professional manner has introduced new aspects in socio-economic, human relations, concept development, and service utilization terms as spin-offs. This is evident from the general public awareness of science-related efforts in our region.

From this region 64 people have passed through our establishment; 42 through training (16 women and 26 men), with an additional 22 participating in other A.R.E. activities. Each profited from the experience.

More than a thousand visitors from all corners of the world have enjoyed our hospitality and, from case to case, used our professional services during the twelve years of our presence in Pond Inlet.

Our efforts here have been supported by federal and territorial government departments, by Brock University of St. Catharines, Ontario, by foreign scientific institutions, as well as individuals and citizens from Canada and other countries.

We in turn have financially and materially supported quite a number of researchers and students from the Federal Government and scientific institutions from Canada and abroad. In addition, field and data support contracts, primarily with federal agencies, have provided employment for our resident technicians. During the past twelve years more than 250 documents have included references to our work, contributions, and other related subjects, and a list of such documentation is presently being revised to be issued this summer.

Because our continuous presence results in baseline data, with the occasional or periodical verification of an observed process, we often cannot use normal publication procedures. Our information is available to general researchers via the Polar Continental Shelf Project library (880 Wellington Street, Ottawa K1A 0E4) and, for more serious researchers, by direct communication with us.

Governing our policy regarding free information is the premise that non-resident researchers and investigators usually can offer something that they could leave in the North with our resident technicians, such as knowledge or skills or exchange publications. As this establishes a collaborating fellowship relation on an individual as well as institutional level, this approach has been mutually profitable.

Posters

On the posters presented by Ely Panipakoocho at the ACUNS meetings in Edmonton, are shown results of our work, pointing out short- and long-term trends and changes in the atmospheric and hydrospheric regimes.

They also show examples of seasonal changes in the temperature, salinity, DO and pH of the seawater; of the relations between air temperatures and the growth of sea ice; and of variations in some chemical constituents of brine in sea ice and snow.

The pictures on the posters draw attention to the people and to the various natural events throughout the year that are important in the daily life of the people.

Following is a list of programs, projects (P) and experiments (E).

A.R.E. PROGRAMS

Program #1: Atmosphere - sea ice and ocean monitoring program, Eclipse Sound, N.W.T., at Pond Inlet. Duration: 12-15 years (estimate). Start: 1972.

Program #2: Radar signal return classification and categories from sea ice, bergs and floes, on the Lancaster Sound. Duration: 10 years (estimate). Start: 1978.

Program #3: Large scale deformation of sea ice. Collect experience from Eclipse Sound and apply to N.R.C. Adams Island project (AIP). Duration: 3 years. Start: 1982.

Program #4: Sea-ice and snow chemistry. Revision and updating of references and factors for the thermodynamic and other engineering calculations, covering periodically full-profile sampling of sea ice and snow from freeze-up to break-up on the Eclipse Sound, and analysis of 4 cations and 3 anions. Duration: 3 years. Start: 1984 freeze-up.

Program #5: Eastern Arctic Seaboard Monitoring Program - Concept. Semi-continental operational real-time data, scale and pproach. 9 communities involved (Grise Fjord, Resolute Bay, Arctic Bay, Pond Inlet, Clyde River, Broughton Island, Pangnirtung, Frobisher Bay (Ikaluit), Igloolik). Duration: 5 years. Start: 1985.

A.R.E. PROJECTS

P-1-1-73. Training techniques for local residents of the North.
P-1-2-73. Classification of seasonal phenomena of sea ice.
P-1-3-74-80. Development of "on-the-job" training programs for local residents.
P-1-4-74-. Field observations and measurements procedures for sea-ice research.

P-1-5-74-. Freeze-up and break up observations, methods.
P-1-6-78-. Design of computer programs for data storage and massaging.
P-2-1-73-76. Establishment of surface weather station YIO in Pond Inlet.
P-2-2-78. Design and construction of Bylot radar station.
P-2-3-79. Design and construction of the Qaiksut base camp.
P-2-4-80/81. Design and construction of the Borden radar station.
P-2-5-81-82. Design and construction of the Nunguvik arctic centennial station.
P-2-6-81. Design and construction of the Adams Island shelter.
P-3-1-73. All-terrain vehicle design criteria for missions in the North.
P-3-2-74-84. Portable diesel-hydraulic power drives for winches and hand tools.
P-3-3-74-76. Development of safe surface transportation by sled on sea-ice for instruments, samples and equipment.
P-3-4-75. Design and construction of a three-sled-mounted assembly of facilities serving as an oceanographic support station.
P-3-5-76-78. Through-the-sea-ice installation and operation of standard wet batteries used as power supply for recording instruments.
P-3-6-79. Water temperature measuring bottle.
P-3-7-81. Design, supervision and commission of modular panel constructed, lightweight, portable cold room.
P-3-8-83. Development and production of low ambient temperature (minus 50°C) thermocouple-measurement instruments.
P-3-9-81-82. Electronic distance measuring equipment (EDM).
P-3-10-83. Periscope for under-ice observations, waterproof.
P-4-1-72-76. Ambient conditions preceding the occurrence of cracks on Eclipse Sound, Navy Board Inlet and Tay Sound.
P-4-2-72-84. Ambient conditions for forming rafts and ridges on Eclipse Sound and Navy Board Inlet.
P-4-3-74-78. Snow and sea-ice surface area roughness in relation to the spring melt progress.
P-4-4-74-. First-year sea-ice and berg ice moduli determinations.
P-4-5-78-81-. Terrestrial impurities on sea-ice and snowcover in relation to the spring melt progress.
P-4-6-76-84-. Ice floe movements - time and motion studies.
P-4-7-79-81. Sea-ice observations, samples and measurements at the Nanisivik wharf.
P-4-8-77-. Icebergs.
P-4-9-78. Sea-ice ground truthing for remote sensing aircraft.
P-4-10-78. Snowcover temperature profiles.
P-4-11-80. Physical characteristics of a sea-ice road.
P-4-12-82-. pH of sea-ice and snowcover melt.
P-4-13-82. Refrozen ships track investigation.
P-4-14-83-. Chemical constituent ratios of the brine in sea ice, snowcover and salts in seawater.
P-4-15-84-. Sea-ice thickness versus current and depth of water.
P-5-1-73. Tide measurements
P-5-2-76-78. Collection of benthos samples.
P-5-3-76-80. Collection of sea-ice micro-algal samples.
P-5-4-78-. Establishment of the surface current-directions on Eclipse Sound and Navy Board Inlet.

P-5-5-78-. Nearshore-currents and floe movements, Eclipse Sound and Navy Board Inlet.
P-5-6-82. Oceanographic buoy and satellite data transmission.
P-5-7-82. Beach soil temperatures at Pond Inlet.
P-5-8-82. Hydrographic survey around Adams Island.
P-6-1-72-. Birds in the Pond Inlet area.
P-6-2-72-. Flowers and plants in the Pond Inlet area.
P-6-3-72. Sea mammal observations.
P-6-4 79. Seaweed collection.
P-6-5-79. Lemmings.
P-6-6-85. A biological and wildlife clock for Pond Inlet.
P-7-1-72. Salmon River coal deposits.
P-7-2-79. Metallurgy metal corrosion.
P-7-3-81-82. Fossil collection.
P-8-1-74. Clouds. Formation of anvil and lenticular clouds and visible inversions.
P-8-2-78-. Comparison of synoptic chart projections with actual measurements and observations.
P-8-3-79-. Quantifying "trace" precipitation and relation to dew point and dry bulb temperature.
P-8-4-82. Regional hydrography-watersheds.
P-8-5-82-. Evaporation-sublimation measurements from first-year sea-ice and snowcover.

A.R.E. EXPERIMENTS

E-1-1-72-. Static electricity - impairment of measuring circuits and equipment in a cold environment.
E-1-2-74-82. Evaluation of thermocouples vis-à-vis thermistors for field use in arctic conditions.
E-1-3-75-. Sound levels and patterns in sea-ice 50-20,000 Hz.
E-1-4-76-81. Near invisible surface icing of electrical connectors and contacts.
E-1-5-77-78. Evaluation of two micro-algal sampling techniques, one from above and one from below the ice (diving).
E-1-6-79. Comparisons of salinity determinations by three different instruments.
E-1-7-82. Field evaluation of the "Fluke" digital thermometer.
E-1-8-83. Observations and measurements of the icing of thermocouple sensors in the seawater.
E-1-9-83. Zero degree C reference water/ice bath.
E-2-1-72-80. The use of floes and bergy bits for protection of the seashore in tidal water areas.
E-2-2-72-. Air-temperature profiles between sea-level and elevations of 1800m during the months of March to August in various years at Pond Inlet and on NW Bylot Island.
E-2-3-74-. Ice crystal formation, temperature and salinity of seawater, various years. Eclipse Sound.
E-2-4-75-. Salt migration from sea-ice to the snowcover.
E-2-5-75-. Spatial and temporal variations of sea-ice thickness and salinity as well as snowcover on 1 to 5 and 10 meter grids.

E-2-6-75-76. Sea-ice density measurements. Comparison of the wet (immersed) and dry method.

E-2-7-75-83/84-. Sea-ice samples, extinction period of crystal dynamics after sampling.

E-2-8-76-84-. Comparison of nearshore current characteristics with the stress and strain measurements of the sea-ice.

E-2-9-82-83. Sea-ice temperature variations compared to tidal cycle variations and determination of significant time intervals for measurements.

E-2-10-83. Sea-ice/seawater interface precision current measurements.

E-2-11-83. Evaporation measurements from snow on land at temperatures below minus 12°C.

APPENDIX A

I. REPORT OF THE RESEARCH AND FIELD FACILITIES COMMITTEE

RAPPORT DU COMITÉ DE LA RECHERCHE ET DES INSTALLATIONS SUR LE TERRAIN

FRED COOKE, CHAIRMAN/PRÉSIDENT

II. REPORT OF THE COMMITTEE ON RELATIONS WITH NORTHERN PEOPLES

RAPPORT DU COMITÉ DES RELATIONS AVEC LES RÉSIDENTS DU NORD

TONY WILLIAMSON, CHAIRMAN/PRÉSIDENT

III. REPORT OF THE EDUCATION COMMITTEE

RAPPORT DU COMITÉ DE L'ÉDUCATION

JAMES CAREFOOT, CHAIRMAN/PRÉSIDENT

I

ACUNS RESEARCH AND FIELD FACILITIES COMMITTEE

REPORT 1984-85

COMMITTEE CHAIR: FRED COOKE, QUEEN'S UNIVERSITY

1984-85 was a year of inaction for the Research Committee. The major concern in 1983-84 was to ensure optimal availability and utilization of Arctic Field Facilities. During the year, we learned that the Biological Council of Canada under the chairmanship of Dr. Brock Fenton was in the process of preparing a policy document on Field Facilities for presentation to various departments of the Federal Government. In addition to preparing a compendium of all biological field stations, they presented proposals to NSERC which could lead to a policy for funding such facilities. ACUNS associated itself with the initiative of the B.C.C. and was represented at a meeting which presented the proposals. The initiative is now with NSERC.

As a way of increasing awareness within universities for Arctic field facilities, Peter Adams, the Association's new Executive Director, has discussed with me the idea of making a lecture tour of ACUNS-affiliated universities, during which he would explain the various field facilities which are available in the North.

Fred Cooke
Chairman

April 9, 1985

I

RAPPORT DU COMITÉ DE LA RECHERCHE ET DES INSTALLATIONS SUR LE TERRAIN

1984-85

PRÉSIDENT DU COMITÉ: FRED COOKE

Au cours de l'année 1984-85, le Comité de la recherche a été inactif. Sa principal occupation, en 1983-1984, avait été d'assurer que les stations de terrain de l'Arctique étaient disponibles et utilisées de façon optimale. Au cours de l'année, le Comité a appris que le Conseil canadien de biologie (CCB), sous la présidence de M. Brock Fenton, s'occupait de rédiger un énoncé de politique au sujet des stations biologiques, afin de le soumettre aux divers ministères fédéraux. Outre le répertoire des stations biologiques qu'il avait compilé, le CCB a soumis au Conseil de recherches en sciences naturelles et en genie des propositions qui pourraient déboucher sur l'élaboration d'une politique de financement de ces stations. L'AUCEN s'est associée à cette initiative du CCB, et était représentée à la réunion au cours de laquelle ces propositions ont été présentées. C'est maintenant au CRSNG d'y donner suite.

En vue de mieux sensibiliser les universités à l'utilisation des stations de terrain arctiques, le nouveau Directeur général de l'AUCEN, M. Peter Adams, a examiné avec moi les possibilités de présenter une série de conférences dans les universités membres de l'AUCEN. Au cours de ces conférences, M. Adams décrirait les diverses stations de terrain disponibles dans le Nord canadien.

Le président du Comité

Fred Cooke

le 9 avril 1985

II

Assessment of Survey on the ACUNS Ethical Principles for the Conduct of Research in the North

— A Report of the ACUNS Committee on Relations with Northern Peoples —

Introduction

The Board of Directors of the ACUNS at its October, 1984 meeting decided to assess the impact of its publication, "Ethical Principles for the Conduct of Research in the North", in order to determine what steps the ACUNS might take to further the practice of ethical conduct for research in the North.

Questionnaire and Responses

Accordingly, the Chairman of the Committee on Relations with Northern Peoples was asked to undertake a survey among those groups in the North to whom the "Ethical Principles" were distributed in June, 1982. A questionnaire and covering letter (see Appendix "A") were mailed out to 80 northern community councils, hamlet offices, settlement managers, native organizations and research organizations. There were 20 respondents to the questionnaire, representing 25% of those receiving the questionnaire. Only six of the respondents acknowledgedreceiving copies of the "Ethical Principles" and 16 of the respondents requested copies of the booklet. Half of the respondents stated that they had received or were aware of grievances regarding the conduct of research in the North.

Comments and Suggestions from Respondents

A number of respondents suggested that effort should be directed at disseminating information on "Ethical Principles" at the community level. However, no suggestions were forthcoming on who should take the initiative for increasing awareness at the community level. A number of respondents from the N.W.T. pointed out that the Science Advisory Board looks after research permits and licences in the N.W.T., and that this mechanism provides enough safeguards for enforcement of ethical conduct. It was suggested that enforcement of ethical conduct should be by northerners

... 2

themselves at the community level, and that it would be prohibitively costly and useless for the ACUNS to attempt to enforce the "Ethical Principles" or to conduct a peer review for all research in the North. However, it was also suggested that research permit recipients should receive copies of the "Ethical Principles" and that the ACUNS should implement a review process for compliance by all member universities. It was further suggested that notice of the "Ethical Principles" should be announced in the CARC publication, Northern Decisions.

Respondents recommended that the ACUNS hold seminars at member universities regarding the conduct of research in the North, and that special sessions on ethics and research be placed on the agenda of conferences, such as, the Inuit Studies Conference. The ACUNS was also advised to work more closely with the Inuit Circumpolar Conference and the SSHRC, which have also adopted guidelines for the conduct of research.

One respondent suggested that a special committee hold quarterly "hearings" on the conduct of research in the North. One suggestion, that the guidelines be adopted as formal policy by the member universities of the ACUNS, was already accomplished at the Annual General Meeting of the ACUNS in Calgary in 1981. It was also suggested, however, that northern groups should also formally adopt the "Ethical Principles", and to help revise them as well as to enforce them.

Finally, one respondent commented on the content of the ACUNS booklet. The view was put forward that ethics are universal and that special "Ethical Principles" for research in the North represents a double standard. Ethics, in the view of the respondent, are universal and it would be more appropriate to outline rules of conduct which should be accepted in writing by researchers receiving public funding. The same respondent recommended eliminating the consent aspect of the "Ethical Principles" because it contains elements of "non-scientific assumptions". The view was also put forward that Item 13 in the booklet ("If, during the research, the community decides that the research may be unacceptable to the community, the researcher and the sponsor should suspend the study") mixed politics with ethics.

Summary and Recommendations

(1) It is clear from the number of respondents who stated that they did not receive copies of the "Ethical Principles", that many of the booklets sent to communities and organizations got lost in the shuffle. Perhaps the only remedy is to re-circulate the booklet periodically.

(2) Enforcement of ethical conduct is properly maintained at the community level in the North. However, the member universities of the ACUNS should make every effort to ensure that its researchers receive a copy of the booklet. In addition, a substantial number of booklets should be placed with the Science Advisory Board of the N.W.T.

(3) The ACUNS should request that "Ethical Principles" be included in the agenda of appropriate conferences (e.g., the Inuit Studies Conference) and the ACUNS should organize these sessions when accepted by the conference.

(4) There are now numerous northern communications societies with active radio and television broadcasting networks. It is recommended that the ACUNS explore with these communications societies the possibility and format for discussing the "Ethical Principles" on their networks. A copy of the booklet and this evaluation should be sent to northern communications societies as a starting point for these negotiations.

Respectfully submitted,

Tony Williamson
Chairman
Committee on Relations with
Northern Peoples

TW/gg
26/3/85

II

Conclusions de l'enquête sur les Principes d'éthique proposés par l'AUCEN pour la conduite de la recherche dans le Nord

- Rapport du Comité de l'AUCEN pour les relations avec les résidents du Nord - 1984-85

Introduction

Lors de sa réunion d'octobre 1984, le conseil d'administration de l'AUCEN a décidé d'évaluer l'influence de sa publication: "Les Principes d'éthique pour la conduite de la recherche dans le Nord", en vue de déterminer quelles actions l'AUCEN pourrait accomplir pour diffuser largement les principes déontologiques de la recherche dans cette région.

Questionnaire et Réponses

En conséquence, le président du Comité des relations avec les résidents du Nord a été chargé d'effectuer une enquête auprès des groupes actifs dans le Nord, auxquels l'AUCEN avait envoyé des exemplaires de ces "Principes d'éthique" en juin 1982. Le Comité fit parvenir un questionnaire et une lettre d'accompagnement (voir l'Annexe "A") à quelques 80 conseils municipaux nordiques, agences locales, gestionnaires de village, associations autochtones et organismes de recherches. Vingt personnes ou organismes répondirent, soit 25 pour cent de l'échantillonnage interrogé. Seulement six de ces correspondants disaient qu'ils avaient reçu un exemplaire des "Principes d'éthique"; seize en demandèrent. La moitié de ces correspondants ont signalé qu'ils avaient reçu des plaintes concernant la façon dont les recherches étaient conduites dans le Nord, ou savaient qu'on s'était plaint à ce sujet.

Observations et Propositions des Correspondants

Un certain nombre de correspondants ont indiqué qu'il fallait diffuser les Principes déontologiques au palier de la collectivité. Cependant, aucun d'entre eux n'a désigné d'organisme devant prendre l'initiative de sensibiliser la collectivité à ce sujet. Un certain nombre de correspondants soulignaient que la Commission consultative scientifique des T.N.-O. délivrait les permis et autorisations de recherches dans cette région et que ce mécanisme fournissait un cadre suffisant à la mise en oeuvre des Principes déontologiques de la recherche. On indiquait qu'il fallait charger les Nord-Canadiens eux-mêmes, au palier collectif, d'imposer ces "Principes d'éthique", mais qu'il serait impossiblement coûteux pour l'AUCEN d'essayer de la faire, ou de demander à des experts d'évaluer la façon dont les recherches sont menées dans le Nord. Cependant, certains correspondants ont indiqué que les détenteurs de permis de recherches devraient recevoir un exemplaire des "Principes d'éthique", et que l'AUCEN devrait mettre en place un mécanisme pour surveiller l'application des principes déontologiques par les chercheurs universitaires. D'autres ont proposé que le Comité canadien des ressources arctiques publie un avis de parution des "Principes d'éthique" dans sa publication, Northern Decisions.

Certains correspondants ont recommandé que l'AUCEN convoque des séminaires dans les universités membres, afin d'étudier les méthodes de réalisation des recherches dans le Nord, et qu'on inscrive l'examen de la

déontologie des recherches nordiques à l'ordre du jour des conférences pertinentes, telle la Conférence des études inuit. D'autres ont proposé que l'AUCEN oeuvre en liaison étroite avec la Conférence circumpolaire des Inuit et le Conseil de recherches en sciences humaines du Canada, qui ont également adopté des règles pour la conduite des recherches.

Un correspondant a proposé qu'un comité spécial tienne des "audiences" trimestrielles sur la conduite des recherches dans le Nord. Une proposition d'adoption officielle de ces règles déontologiques par les universités membres de l'AUCEN avait déjà été prise lors de l'Assemblée annuelle de l'AUCEN à Calgary, dès 1981. On a cependant proposé que les associations nordiques adoptent officiellement ces "Principes d'éthique" et contribuent à leur mise en oeuvre et à leur révision régulière.

Un correspondant a offert des remarques sur le contenu de la brochure déontologique de l'AUCEN. Il estime que le code moral est universel, et que la mise en oeuvre des "Principes d'éthique", pour les recherches dans le Nord en particulier, constitue en fait une double conception de la morale. Celle-ci, selon ce correspondant, est de caractère universel, et il serait plus approprié d'élaborer des lignes de conduite de la recherche que les chercheurs financés à même les deniers publics devraient accepter par écrit. Le même correspondant recommande qu'on supprime l'aspect consensuel de ces "Principes d'éthique", car il se fonde sur des postulats non scientifiques. Il estime également que l'article 13 de ces principes déontologiques ("Si au cours de la recherche, la communauté décide que cette recherche peut être inacceptable pour la communauté, le chercheur et le patron devraient interrompre l'étude.") risque de confondre morale et politique.

Sommaire et Recommandations

1) Comme un certain nombre de correspondants déclarent qu'il n'ont pas reçu d'exemplaire des "Principes d'éthique", il paraît évident que quelques-unes de ces brochures se sont égarées. Le seul remède est peut-être de distribuer périodiquement cette brochure.

2) Dans le Nord, c'est au niveau de la collectivité qu'il est possible d'obtenir la mise en oeuvre effective des principes déontologiques. Cependant, les universités membres de l'AUCEN devraient s'assurer que leurs chercheurs en reçoivent un exemplaire. De plus, il faudrait envoyer à la Commission consultative scientifique des T. N.-O. un nombre convenable de brochures.

3) L'AUCEN devrait demander que les "Principes d'éthique" soient inscrits à l'ordre du jour des conférences appropriées (telle la Conférence des études inuit), et organiser le déroulement des séances correspondantes dès leur acceptation pour la conférence.

4) Il existe actuellement de nombreuses sociétés nordiques de radiotélévision disposant d'un réseau actif de radiodiffusion ou de télévision. Nous recommandons que l'AUCEN étudie, de concert avec ces sociétés de radiotélévision, les possibilités de débattre les principes déontologiques de la recherche sur leurs ondes, et la forme de ces débats. Comme point de départ de ces négociations, il faudrait envoyer à chacune de ces sociétés un exemplaire des "Principes d'éthiques" et la présente évaluation.

Ces propositions sont soumises à votre considération.

Le président du Comité des relations
avec les résidents du Nord

Tony Williamson

le 26 mars 1985

APPENDIX "A"

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

Labrador Institute of Northern Studies
P.O. Box 309, Station A
Goose Bay, Labrador
A0P 1S0

Telephone: 896-2978/9
Telex: 016-2280

January 14, 1985

Dear Sir/Madam:

In 1982, the Association of Canadian Universities of Northern Studies (ACUNS) published and distributed throughout the North the pamphlet "Ethical Principles for the Conduct of Research in the North". Printed in English, Syllabics and French, it set forth 18 principles as guidelines for researchers in the North. These were adopted by the member universities of the ACUNS.

As Chairman of the ACUNS Committee on Relations with Northern Peoples, I am attempting to find out how well these principles are being followed by researchers in the North; whether or not the pamphlet has been of any use to Northern communities and organizations, and whether or not there are grievances related to the conduct of research in the North which continue to be of concern to Northern residents. Finally, the ACUNS would like to know if there is any continuing role it can play in furthering the application of the "Ethical Principles" in the North.

I would appreciate it a great deal if you or a representative of your organization would be able and willing to take a few minutes to write down your comments on the above questions and mail them to me: c/o The Labrador Institute of Northern Studies, P.O. Box 309, Station A, Goose Bay, Labrador, AOP 1SO.

If you are interested and willing to reply, you are welcome to do so in any manner you desire. I enclose a small questionnaire in order to simplify a reply. However, I am more interested in knowing if the issue is of concern and the pamphlet is of use, rather than in taking up your time with another form.

With many thanks for your interest.

Sincerely yours,

Tony Williamson

Tony Williamson
Director

TW/gg
Encl.

ACUNS QUESTIONNAIRE

Ethical Principles for the Conduct of Research
in the North

NAME/ORGANIZATION: _____

		YES	NO	DON'T KNOW
1.	Did your organization receive a copy of the ACUNS pamphlet "Ethical Principles for the Conduct of Research in the North"?	☐	☐	☐
2.	Were the "Ethical Principles" circulated to the members of your organization?	☐	☐	☐
3.	Would your organization like more copies of the "Ethical Principles"? If so, how many? _____	☐	☐	☐
4.	Have you received any comments on the "Ethical Principles"?	☐	☐	☐
5.	Does your organization receive any grievances regarding the conduct of research in the North?	☐	☐	☐

6. Do you have any suggestions on how the ACUNS might increase general awareness of the "Ethical Principles"?

_____

_____

_____

_____

_____

7. Do you have any suggestions concerning how the "Ethical Guidelines" can be applied or enforced in the north; by northerners or the ACUNS?

_____

_____

_____

_____

_____

8. Do you have any other comments or observations you would like to make?

_____

_____

_____

_____

_____

III

ACUNS EDUCATION COMMITTEE

REPORT 1984-85

COMMITTEE CHAIR: JAMES CAREFOOT, UNIVERSITY OF REGINA

During 1984-85, the Education Committee has been guided by its objective:

> To monitor developments and opportunities in distance education and to be a source of advice on the potential of distance education to northern needs.

A tangible achievement of the Association in 1984-85 was Occasional Publication #12 - Distance Education in the Canadian North: An Annotated Bibliography. More than 50 copies were distributed to associations and institutions and requests for these continue to be received.

Membership on the Committee for 1984-85 remained the same as for 1983-84 and included Ms. Susan D'Antoni, Senior Analyst, Statistics Canada (on executive leave from Ryerson Polytechnical Institute); Dr. Paul Laurin, Dean of Graduate Studies, Université du Québec à Trois-Rivières; Dr. Marie Sanderson, Department of Geography, University of Windsor; and the Chairman.

The Committee met once on March 20, 1985 in Montreal with the primary, but not exclusive, purpose to consider the role of ACUNS with respect to distance education. Two guests, Dr. Gail Valaskakis, Director of Communication Studies, Concordia University, and Dr. Marianne Stenbaek, McGill University, provided advice and background for the Committee. Dr. Raymond Paquin attended for Dr. Laurin and Dr. Sanderson was unable to attend.

The Committee recommends the following:

1) ACUNS has a role as a liaison agent in distance education. It is too early to tell whom directly it should be approaching but for now it should indicate an interest and willingness to assist organizations. Initiatives or assistance which might be viewed as competitive or partisan should be avoided.

2) The type of support which ACUNS could offer in distance education involve:

   a) technical and production expertise
   b) curriculum development and delivery
   c) assistance with funding proposals and joint sponsorships

3) A watching brief in distance education is essential. Developments such as the Knowledge Network of the West, Access Alberta, the Inuit Broadcasting Corporation and others with the potential for networking must be nurtured.

The Committee is available, if necessary, to assist with the broader, yet connected, issue of the role of universities in post-secondary education in the North.

James B. Carefoot
Chairman

April 9, 1985

III

COMITÉ DE L'AUCEN POUR L'ÉDUCATION

RAPPORT DE 1984-85

PRÉSIDENT DU COMITÉ: M. JAMES CAREFOOT, UNIVERSITÉ DE RÉGINA

Au cours de l'année 1984-85, le Comité de l'éducation a orienté son action en vue de:

suivre de près les progrès de l'enseignement à distance, détecter les occasions d'agir, et constituer une source d'information sur les possibilités que l'enseignement à distance offre pour satisfaire les besoins du Nord canadien.

La publication occasionelle nº 12: Distance Education in the Canadian North: An Annotated Bibliography, parue en 1984-1985, est un résultat tangible des efforts de l'Association; celle-ci en a distriué plus de 50 exemplaires aux associations et établissements d'enseignement, et satisfait les demandes qui continuent à lui parvenir.

En 1984-1985, les membres du Comité sont restés les mêmes qu'en 1983-1984, soit: Mlle Susan D'Antoni, Analyste principale à Statistique Canada (en détachement formatif de l'Institut polytechnique Ryerson); Professeur Paul Laurin, Doyen des études avancées à l'Université du Québec à Trois-Rivières; Professeur Marie Sanderson, du Département de géographie de l'Université de Windsor, et le président du Comité.

Le Comité s'est réuni une fois à Montréal, le 20 mars 1985, dans le but principal, mais non exclusif, d'étudier le rôle de l'AUCEN en matière d'enseignement à distance. Deux conférencières invitées: Professeur Gail Valaskakis, Directrice des études sur la communication à l'Université Concordia, et Professeur Marianne Stenbaek, de l'Université McGill, ont fourni des précisions et des conseils au Comité. M. Raymond Paquin a remplacé Professeur Laurin qui, avec Professeur Sanderson, n'a pu assister à la réunion.

Le Comité a fait les recommandations suivantes:

1. L'AUCEN devrait assumer le rôle d'agent de liaison en matière d'enseignement à distance. Mais comme il est trop tôt pour désigner les organismes avec lesquels il lui faudra prendre contact directement, elle pourrait exprimer dès maintenant son intérêt et sa volonté d'aider les organismes pertinents. Elle devrait cependant éviter toute initiative ou aide pouvant paraître rivale ou partisane.

2. le genre d'aide que l'AUCEN pourrait offrir en matière d'enseignement à distance doit se fonder sur:

   a) sa compétence en matières techniques et pédagogiques;
   b) l'élaboration des programmes et leur mise en oeuvre;
   c) son aide sur le plan des propositions de financement du co-parrainage.

3. Il est indispensable de surveiller les progrès de l'enseignement à distance, et le développement des programmes tels que le Knowledge Network dans l'Ouest canadien, Access Alberta, l'Inuit Broadcasting Corporation et d'autres qui offrent des perspectives de déploiement éventuel.

Le Comité est disposé, en cas de nécessité, à contribuer à un effort apparenté, mais plus large, de développement du rôle des universités en matière d'enseignement post-secondaire dans le Nord canadien.

Le président du Comité de l'éducation

James B. Carefoot

le 9 avril 1985

APPENDIX B

REPORT OF THE CANADIAN NORTHERN STUDIES TRUST

RAPPORT DE LA FIDUCIAIRE CANADIENNE D'ÉTUDES NORDIQUES

JOHN STAGER, CHAIRMAN/PRÉSIDENT

REPORT OF THE CANADIAN NORTHERN STUDIES TRUST

1984-85

Members of Council, I have very great pleasure in making the following report.

Trust Management Committee

I would like to express my gratitude and that of the Association to the following individuals who continued to serve as members of the Management Committee this year: R.H. Carlyle, J. Fournier, H.M. French, C.D. Hunt, P.C. Mackie, J.G. Nelson (ex officio), T.H.B. Symons, and H.A. Williamson. We welcomed Mr. Gordon Robertson to the Committee and thank him for agreeing to serve. Our appreciation and thanks go also to Messrs. Carrothers, Labonté and Smyth, who have retired from the Trust Committee, for their contributions.

Fund Raising

Fund raising continues to be a major effort for the Chairman, the ACUNS President and the Association office. In 1984-85, funding requests were sent to some forty foundations and corporations in Canada and the United States. In addition, Harry Carlyle contacted a number of companies in Calgary and we thank him for his efforts on our behalf.

The results of this fund raising campaign were somewhat disappointing. However, we are grateful to the MacMillan Family Northern Canada Fund, the Lee Foundation, Gulf Canada Ltd., BP Exploration Canada Ltd., Suncor Inc., and the CSL Group for their support. We would also like to thank the Royal Canadian Geographical Society for a generous donation.

Support was solicited from appropriate departments of Provincial governments, but no assistance was forthcoming from this source. The Trust initiated a campaign for individual donations from the academic community and we are grateful to those who responded generously to this appeal.

Two proposals for Senior Fellowships based on matching grants were received from Dr. Lynda Lange and Dr. Marianne Stenbaek. Matching funds would be provided for the former by the Science Advisory Board of the Northwest Territories, and for the latter by McGill University.

A new initiative for the Trust in collaboration with the Native Economic Development Program will provide $125,000 to CNST to award up to ten Studentships to Native students in Canadian universities and to establish a special Awards Committee for this program. The Studentships will be awarded for work at the post baccalaeaurate level on degree and diploma programs, and the competition will be open to Native university students across the country. The membership of the Awards Committee will include representatives of the Native academic community and of the Canadian Northern Studies Trust and ACUNS. At the time this report was written, details for the management of

this fund were being worked out and the Trust expects to announce the program formally in the near future.

As a result of all these efforts which raised more than $200,000, the Donner Canadian Foundation authorized payment in the amount of $100,000 as the third instalment of its four year grant. We are grateful to the Foundation for its continued support and encouragement.

1985-86 Awards

This year the Trust offered three types of Awards - Studentships valued at $10,000 each, Special Awards for Northern Residents, valued at $5,000 each and Senior Fellowships. These latter were included in the initial proposal which established the Trust and the Management Committee was pleased to be able to initiate this program.

Ninety-three applications were received for Studentships, seven for Special Awards and two for Senior Fellowships. The Committee met on March 31 and April 1, 1985 and made the following awards.

Studentships

1. Allan R. Chapman, Trent University
2. Rose Dufour, Université Laval
3. Kelvin Dushnisky, University of Manitoba
4. Paul Grigoriew, University of Waterloo,
5. Martha Johnson, University of Toronto
6. Peter Kotanen, University of Toronto
7. Claire Mailhot, Carleton University

Special Awards

1. Sarahme Akoomalik, Pond Inlet
2. Oksana Choulik, Schefferville
3. George Qualaut, Igloolik
4. To be determined.

Since the Lee Foundation grant had special descriptive conditions in the type of student program, at the time of writing this report we were in correspondence with them to determine an appropriate recipient for their award.

Senior Fellowships

L. Lange, Science Institute of the Northwest Territories
M. Stenbaek, McGill University

The terms and conditions of the matching grants are in negotiation.

Again this year with over 90 applications for studentships, there was ample demonstration of a high level of interest in northern studies by students of exceedingly fine academic promise. A review of this response with some agencies, particularly governments, may have a salutary effect upon demonstrating the importance of our mission.

Conclusion

I wish to take this opportunity, on behalf of the Trust, to express profound thanks to a number of people. The Management Committee together were dedicated and hard working and deserve our thanks. Gordon Nelson has committed a great deal of his considerable energy and imagination to this year's success; we couldn't have done it without him. Also, David Judd, past Executive Director of ACUNS, was always there to initiate and follow many of the ideas and concerns that went towards building the Trust. Without doubt, the very able help and timely advice from Eileen van Heyst provided the strong central support that kept all of our efforts on the rails. Let me on your behalf offer sincere thanks for their part in what has been a very good year.

John K. Stager
Chairman

April 2, 1985

RAPPORT DE LA FIDUCIAIRE CANADIENNE D'ÉTUDES NORDIQUES

1984-85

J'ai le très grand plaisir de présenter le Rapport qui suit aux membres de l'AUCEN.

Le Comité de gestion de la Fiduciaire

J'exprime mes remerciements personnels et ceux de l'Association aux personnes suivantes, qui ont largement consacré de leur temps aux travaux du Comité de gestion pendant l'année écoulée: R.H. Carlyle, J. Fournier, H.M. French, C.D. Hunt, P.C. Mackie, J.G. Nelson (ès qualités), T.H.B. Symons et H.A. Williamson. Le Comité a accueilli M. Gordon Robertson en son sein, et nous remercions M. Robertson d'avoir accepté de participer à ses travaux. Nous remercions également MM. Carrothers, Labonté et Smyth, anciens membres du Comité, pour leur collaboration à ses activités.

Recueil de fonds

Le recueil de fonds pour la Fiduciaire constitue toujours une activité capitale du président du Comité, du Président de l'AUCEN, et du bureau de l'Association. Au cours de l'année 1984-85, environ quarante fondations et sociétés commerciales du Canada et des États-Unis ont été sollicitées à ce propos. De plus, M. Harry Carlyle a pris contact avec un certain nombre d'entreprises de Calgary, et nous le remercions de ses efforts accomplis pour le compte de la Fiduciaire.

Les résultats de cette campagne de souscription de fonds ont été un peu désappointants. Cependant, nous remercions vivement le MacMillan Family Northern Canada Fund, la Lee Foundation, Gulf Canada Limitée, BP Exploration Canada Limitée, Suncor Inc. et le Groupe CSL pour leurs contributions. Nous remercions également la Société royale géographique du Canada pour sa généreuse donation.

Nous avons également sollicité des dons des ministères provinciaux pertinents, mais malheureusement rien n'a été recueilli auprès de ces sources. La Fiduciaire a mis sur pied une campagne pour recueillir des dons auprès de la collectivité universitaire, et nous remercions ceux qui ont répondu généreusement à cet appel.

Mmes Lynda Lange et Marianne Stenbaek nous ont fait parvenir des propositions de Bourses de perfectionnement en co-financement. Ce dernier proviendrait respectivement de la Commission consultative scientifique des Territoires du Nord-Ouest et de l'Université McGill.

Une initiative de la Fiduciaire, en collaboration avec les responsables du Programme de développement économique des Autochtones, permettra de recueillir 125 000 $ et financer jusqu'à dix bourses d'études allouées par la Fiduciaire à des Autochtones étudiant dans les universités canadiennes, et de

mettre sur pied un Comité des bourses spécial pour administrer ce programme. Ces bourses d'études seront attribuées à des étudiants des cycles supérieurs suivant des cours de spécialisation, dans le cadre d'un concours ouvert aux étudiants autochtones de tout le pays. Le Comité des bourses comprendra des représentants de la collectivité universitaire autochtone, de la Fiduciaire canadienne d'études nordiques et de l'AUCEN. Au moment de la rédaction du présent Rapport, on mettait au point les détails de la gestion de ce Fonds, et les responsables de la Fiduciaire envisagent d'annoncer sous peu la mise en route du Programme.

À la suite de ces initiatives, qui avaient permis de recueillir plus de 200 000 $, la Fondation canadienne Donner a effectué un versement de 100 000$, le troisième de sa subvention quadriennale. Nous remercions de tout coeur la Fondation qui nous a accordé son soutien constant et prodigué ses encouragements.

Les bourses de 1985-86

Au cours de cette année, la Fiduciaire offrira trois genres différents de bourses: les bourses d'études, d'un montant de 10 000 $ chacune, les bourses spéciales pour les Nord-Canadiens, d'un montant de 5 000 $, et les bourses de perfectionnement. Ces dernières étaient mentionnées dans la proposition initiale de création de la Fiduciaire, et le Comité de gestion a mis en oeuvre ce programme avec plaisir.

Quatre-vingt-treize intéressés ont présenté des demandes de bourses d'études, sept ont demandé des bourses spéciales, et deux des bourses de perfectionnement. Le Comité de gestion s'est réuni les 31 mars et 1er avril, et a attribué les bourses suivantes:

Bourses d'études

1. Allan R. Chapman, Université Trent
2. Rose Dufour, Université Laval
3. Kelvin Dushnisky, Université du Manitoba
4. Paul Grigoriew, Université de Waterloo
5. Martha Johnson, Université de Toronto
6. Peter Kotanen, Université de Toronto
7. Claire Mailhot, Université Carleton

Bourses spéciales

1. Sarahme Akoomalik, Pond Inlet
2. Oksana Choulik, Schefferville
3. George Qulaut, Igloolik
4. À être décidé

La contribution de la Lee Foundation avait certaines conditions requises. Au moment de la rédaction du présent Rapport, nous discutons avec eux le bénéficiaire de leur don.

Bourses de perfectionnement

L. Lange, Institut des sciences des Territoires du Nord-Ouest
M. Stenbaek, Université McGill

Les modalités de co-financement sont en cours de négociation.

Cette année encore, la présentation de plus de quatre-vingt-dix demandes de bourse montre clairement que de nombreux étudiants de grand avenir universitaire s'intéressent vivement aux études nordiques. La prise en compte de ce mouvement par les divers organismes concernés, particulièrement dans le secteur public, aurait un effet salutaire en mettant en évidence l'importance de la mission de la Fiduciaire.

Conclusion

Je profite de l'occasion pour me faire l'interprète de la Fiduciaire canadienne d'études nordiques et remercier en son nom plusieurs personnes, dont les membres du Comité de gestion, qui ont fait preuve de zèle et dont les efforts méritent d'être soulignés. M. Gordon Nelson a largement contribué par son énergie et son imagination à la réalisation des objectifs de cette année, qui n'auraient pu être atteints sans lui; de même, M. David Judd, ancien Directeur général de l'AUCEN, était toujours présent pour prendre les initiatives et donner suite aux efforts qui ont permis de développer la Fiduciaire. Sans aucun doute, les conseils opportuns et fort judicieux de Mme Eileen van Heyst ont permis de canaliser les efforts collectifs dans la bonne direction. Je me fais l'interprète de tous en leur exprimant notre sincère gratitude pour leur contribution aux succès d'une année excellente.

Le Président

John K. Stager

le 2 avril 1985

APPENDIX C

ARCTIC HERITAGE SYMPOSIUM

COLLOQUE SUR LE PATRIMOINE DE L'ARCTIQUE

J. GORDON NELSON, CHAIRMAN/PRÉSIDENT

ARCTIC HERITAGE SYMPOSIUM

REPORT TO COUNCIL, APRIL 27, 1985

Two broad areas of concern are being commented upon as information for Council First is the matter of the proposed program and the list of individuals requested to participate in it. Second is the matter of funding.

In regard to the program and the responses from invited participants, the situation is excellent. All of the over 30 people invited to participate have agreed to do so. There have been a few changes in the program, mainly additions suggested by people who heard of the Symposium and wanted to participate a d whose contributions are considered relevant. Examples are the Regional Seas Program of UNEP, World Heritage Trust and related initiatives, and arctic transport and its relation to heritage in Canada. A number of people have written from overseas asking if they can attend and several endorsements of what we are doing have been forthcoming from overseas as well. It seems therefore that we are making a welcome and valued contribution through the Symposium.

Raising funds for the Symposium has been difficult. We have approached something in the order of 40 organizations. A large amount of support is available through small-scale commitments by organizations to pay for the participation of persons representing them or their interests. We estimate that about 70 people will be invited to the Symposium as chairpersons, speakers and the like, and as participants in discussions. We also can accommodate perhaps 25-30 observers on an application basis. The observers will have all privileges of the symposium. Observers can also participate directly in the proceedings by preparing participant statements on topics of concern, to a maximum of 1,000 words. Major papers and critiques will be prepared by invited knowledgeable persons on a range of topics, including atmospheric, geomorphic and other aspects of Arctic environment, on land use and conservation, and national parks and heritage areas. A full copy of the program will be available at the Council meetings in Edmonton for those interested.

J. Gordon Nelson

April 2, 1985

COLLOQUE SUR LE PATRIMOINE DE L'ARCTIQUE

RAPPORT AU CONSEIL, EN DATE DU 27 AVRIL, 1985

Nous envisageons deux aspects importants de ce Colloque, afin d'informer le Conseil: en premier lieu l'ordre du jour envisagé et la liste des participants invités et, en second lieu, le problème du financement.

En ce qui concerne l'ordre du jour et les réactions des participants invités, la situation est excellente. Les participants invités, soit plus de trente, ont tous accepté leur invitation. Quelques modifications ont été apportées à l'ordre du jour: ce sont, la plupart du temps, des additions proposées par des personnes ayant entendu parler du Colloque, désirant y participer, et dont les contributions paraissent pertinentes. Citons par exemple le Programme des mers régionales du PENU, le World Heritage Trust et les actions apparentées, et les transports arctiques et leurs rapports avec le patrimoine du Canada. Un certain nombre d'intéressés d'outre-mer ont demandé s'ils pouvaient participer à la conférence, et d'outre-mer également on nous a écrit pour approuver nos initiatives. Il semble donc que la convocation de ce Colloque soit bienvenue et constitue une contribution très valable.

Mais le recueil de fonds pour le Colloque a été malaisé. Nous avons pris contact avec environ quarante oganismes. Une large part du soutien financier disponible prend la forme d'engagements à défrayer les participants représentant les organismes intéressés ou soutenant leur point de vue. Nous estimons qu'environ 70 personnes seront invitées à présider les débats, à présenter des communications et à participer aux discussions. Nous pouvons également accepter de 20 à 30 observateurs sur leur demande. Ils bénéficieront des privilèges des participants au Colloque, et pourront également participer aux débats en présentant des exposés sur des sujets d'actualité, d'une longueur maximale de 1 000 mots. Les principales communications et les critiques seront rédigés par des spécialistes d'un certain nombre de domaines, tels les aspects atmosphériques, géomorphologiques et autres des régions arctiques, l'utilisation du territoire, la protection de l'environnement et la conservation des parcs nationaux et du patrimoine. Les personnes intéressées pourront obtenir le programme complet du Colloque lors des réunions du Conseil à Edmonton.

J. Gordon Nelson

le 2 avril 1985

APPENDIX D

REPORT OF THE NOMINATING COMMITTEE

RAPPORT DU COMITÉ DES MISES EN CANDIDATURE

JAMES CARRUTHERS, CHAIRMAN/PRÉSIDENT

February 28, 1985

REPORT OF THE NOMINATING COMMITTEE

Chairman: J.B. Carefoot (University of Regina)
J.D. Jacobs (University of Windsor)
P. Morisset (Université Laval)
J.G. Nelson (University of Waterloo)
J.K. Stager (University of British Columbia)

The following names are submitted for election to the Board of Directors at the Annual General Meeting in Edmonton, April 27, 1985.

Officers

President: Marc-Adélard Tremblay (Université Laval)

Vice-President: Hugh M. French (University of Ottawa)

Secretary-Treasurer: Frank Duerden (Ryerson Polytechnical Institute)

Members: Garry K.C. Clarke (University of British Columbia)

J. Gordon Nelson (University of Waterloo)

Peter Schledermann (University of Calgary)

Marianne Stenbaek (McGill University)

All have been contacted and all have agreed to let their names stand.

By-Law 22 (attached) provides for additional nominations. These should be sent to the Secretary-Treasurer at the Association office by April 12, 1985. Nominations so received will be placed on the ballot along with those provided by the Nominating Committee.

Please note also that By-Laws require that "... both official languages shall be represented in the Officers of the Association by the first language of the individual in office" (By-Law 35).

J.B. Carefoot,
Chairman, Nominating Committee

BY-LAW 22 - PROCEDURE FOR ELECTION AT MEETINGS OF COUNCIL

".... The Nominating Committee shall propose names for all elected posts of the Board of Directors and election of Officers. All nominees must be eligible and willing to serve. Additional nominations signed by three delegates may be submitted to the Secretary-Treasurer within fifteen days prior to the meeting.

All other elections that become necessary in the carrying out of the business of the Association shall follow procedures determined by the members present in general meeting.

Faculty or administrators of member institutions are eligible to stand for office as directors or officers provided that at least one-half of the directors and officers elected are members of Council.

In order to achieve this objective the elections of directors and officers shall proceed in the following order:

(a) The election of the President
(b) The election of the Vice-President
(c) The election of the Secretary-Treasurer
(d) The election of the Directors"

le 28 février 1985

RAPPORT DU COMITÉ DES MISES EN CANDIDATURE

Président: J.B. Carefoot (University of Regina)
J.D. Jacobs (University of Windsor)
P. Morisset (Université Laval)
J.G. Nelson (University of Waterloo)
J.K. Stager (University of British Columbia)

Les candidats dont les noms suivent sont proposés au Conseil d'administration en vue de leur élection lors de l'Assemblée Générale Annuelle à Edmonton, le 27 avril 1985.

Officiers

Président:	Marc-Adélard Tremblay (Université Laval)
Vice-Président:	Hugh M. French (University of Ottawa)
Secrétaire-Trésorier:	Frank Duerden (Ryerson Polytechnical Institute)
Administrateurs	Garry K.C. Clarke (University of British Columbia)
	J. Gordon Nelson (University of Waterloo)
	Peter Schledermann (University of Calgary)
	Marianne Stenbaek (McGill University)

Ils ont tout été contactés et se sont tous déclarés d'accord pour que leurs noms demeurent sur la liste.

Règlement 22 (ci-joint) dit que des nominations supplémentaire pourront être effectuées. Ces candidatures devront être envoyées au plus tard le 12 avril 1985 au secrétaire-trésorier, au siège de l'Association. Elles seront, en pareil cas, jointes au bulletin de vote à celles que présentera le Comité des mises en candidature.

Veuillez bien noter en outre que les règlements exigent ce qui suit: ... les deux langues officielles devront être représentées chez les Officiers de l'Association, par leur langue maternelle (règlement no. 35).

J.B. Carefoot,
Président
Comité des mises en candidature

RÈGLEMENT Nº 22 - PROCÉDURE POUR LES ÉLECTIONS AU RÉUNIONS DU CONSEIL

".... Le comité de nomination proposera des noms pour tous les postes à pourvoir, par élection, au conseil d'administration et à la direction. Les personnes nommées devront être éligibles et avoir accepté de servir. Au moins quinze jours avant l'assemblée, des nominations supplémentaires pourront être effectuées et soumises au secrétaire-trésorier sous la signature de trois délégués.

Toutes les élections qui seront nécessaires pour la bonne marche des affaires de l'Association seront effectuées selon les procédures déterminées par les membres présents à l'assemblée générale.

La Faculté ou les administrateurs des institutions membres sont éligibles comme candidats aux postes de directeurs ou officiers, à condition qu'au moins la moitié des directeurs et officiers soient membres du Conseil.

Afin de réaliser cet objectif, les élections des directeurs et officiers seront effectuées dans l'ordre suivant:

(a) Élection du Président
(b) Élection du Vice-Président
(c) Élection du Secrétaire-Trésorier
(d) Élection des Directeurs"

ASSOCIATION UNIVERSITAIRE CANADIENNE D'ÉTUDES NORDIQUES

L'Association représente trente-quatre universités canadiennes actives dans le domaine des études, de la recherche et de la formation sur le Nord. Fondée à Churchill, Manitoba en 1977, c'est une organisation charitable, à but non lucratif et incorporée.

L'objectif de l'Association est l'avancement de l'érudition nordique, grâce à l'éducation, la formation professionnelle et scientifique, et la recherche.

Le Conseil d'administration 1985-87

Président	M.-A. Tremblay, Université Laval
Vice-Président	H.M. French, University of Ottawa
Secrétaire-Trésorier	F. Duerden, Ryerson Polytechnical Institute
Membres	G.K.C. Clarke, University of British Columbia
	J.G. Nelson, University of Waterloo
	P. Schledermann, University of Calgary
	M. Stenbaek, McGill University

Secrétariat

Directeur général	W. Peter Adams
Adjointe administrative	Eileen van Heyst

130 rue Albert, bureau 1915, Ottawa, Canada K1P 5G4
Téléphone: (613) 238-3525

ASSOCIATION OF CANADIAN UNIVERSITIES FOR NORTHERN STUDIES
ASSOCIATION UNIVERSITAIRE CANADIENNE D'ÉTUDES NORDIQUES

MEMBER UNIVERSITIES/UNIVERSITÉS MEMBRES

University of Alberta
Athabasca University
University of British Columbia
University of Calgary
Carleton University
Concordia University
Dalhousie University
École Polytechnique
University of Guelph
Lakehead University
Laurentian University
Université Laval
University of Manitoba
McGill University
McMaster University
Memorial University
Université de Montréal
University of New Brunswick
University of Ottawa
Université du Québec en Abitibi-Témiscamingue
Université du Québec à Chicoutimi
Université du Québec à Montréal
Université du Québec à Trois-Rivières
Queen's University
University of Regina
Ryerson Polytechnical Institute
University of Saskatchewan
Simon Fraser University
University of Toronto
Trent University
University of Waterloo
University of Western Ontario
University of Windsor
York University